







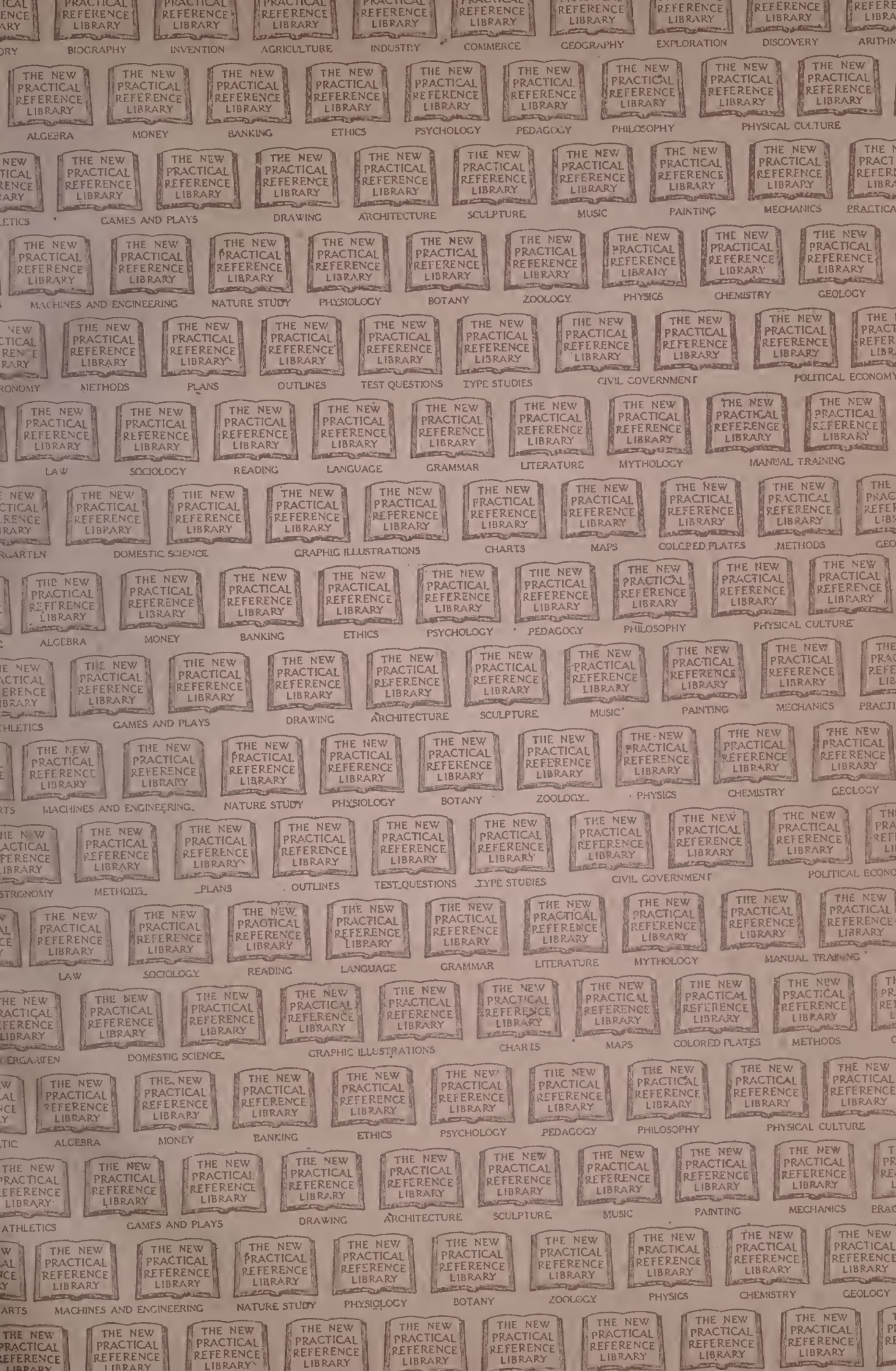
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## VOLUME II

HANSON-ROACH-FOWLER COMPANY

CHICAGO

1918

KANSAS CITY

NEW YORK



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1918

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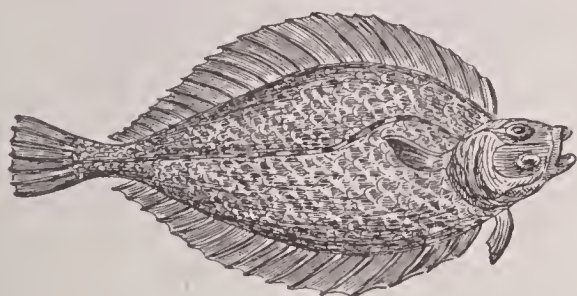
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**D**, the fourth letter in the alphabet. In form our D is the same as the Latin D, which was developed from the Greek Δ. This, in turn, was derived from the Phoenician character, which was probably an outgrowth of an original hieroglyphic representation of a door. The Δ does, in fact, still retain a resemblance to a tent door. In corresponding words of related languages, *d* is often interchanged with *t*, which it resembles in its mode of pronunciation.

In music D is the second note in the natural, or C, scale. As an abbreviation D represents five hundred, and when a line is placed above it, D represents five thousand.

**Dab**, a fish belonging to the family of flat-fishes, which includes also the sole, turbot, halibut, plaice and flounder. The dab is of a pale brownish color, spotted with white, <sup>up</sup> the side which it usually keeps uppermost, and plain white on the underside. It has rougher scales than the other members of the same genus. It is preferred to the flounder for the table. The dab is found on the shores of



DAB

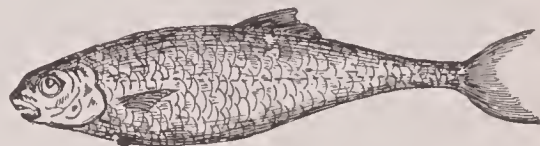
northern Europe and is common on the sandy coasts of Great Britain.

**Dab'chick**, a name which in the United States is commonly given to the pied-billed grebe. See GREBE.

**Dac'ca** or **Dhaka**, the capital of the province of Eastern Bengal and Assam, in India, on the Burhi Ganga, about 150 mi. n. e. of Calcutta. Before the nineteenth century this city was in a very prosperous condition and was important

as a commercial center, being famous for its muslins. It had many beautiful temples and palaces, and a population estimated at 200,000. After this it declined because of the change in the river system of that part of India, and the introduction of British manufactures almost ruined the textile industry, but after the building of a railway through Dacca, the trade revived and the textile manufactures became important again. The city now has several modern public buildings and educational institutions. The manufactures include textiles, fine silver and gold plate and filigree work, and there is also a large trade in elephants. Population in 1911, 108,551.

**Dace**, *dase*, **Dare** or **Dart**, a small river fish of the carp family, resembling the roach,



DACE

but longer and thinner. It is a gregarious fish, swimming in shoals and inhabiting deep, clear streams which have a gentle current. It is a common fish of western Europe, seldom exceeds a pound in weight and is not very good food. The chub of the United States is also sometimes called a dace.

**Dacia**, *da'she ah*, in ancient times, a region north of the Danube, the land of the Daci, afterward a Roman province. It was conquered by the emperor Trajan in 101 A. D., but in 274 A. D., in the reign of Aurelian, it had to be abandoned by the Roman colonists.

**Daddy-long-legs**, a little animal closely related to the spiders. It has a body usually oval or globose, and long, exceedingly slender legs, which are rather elevated in the middle, so that when the animal walks its body almost touches the ground. It has a characteristic disagreeable smell and feeds upon dead insects or small ones which are easily captured. Often



## Dado

the daddy-long-legs is seen in great numbers in barns or other sheltered places.

**Da'do**, in architecture, the middle part of a pedestal, the solid rectangular part between the plinth and the cornice. In the interior of houses, the name is applied to a skirting of wood several feet high around the lower part of the walls, which is often also called wainscot, though this name is more properly given to a paneled dado.

**Daedalus**, *ded'a lus*, a mythical Greek architect and artisan. He built for the king of Crete the labyrinth in which the Minotaur was confined, but having seriously offended the king, he was himself imprisoned. To effect his escape and that of his son, he made two pairs of wings, which he fastened on their shoulders. The son, Icarus, in flying across the sea, rose so high that the heat of the sun melted the wax with which the wings were fastened together, and he fell into the sea and was drowned. Daedalus escaped unharmed.

**Daf'fodil**, the popular name of the yellow narcissus, one of the earliest flowers of spring.

**Daguerre**, *da gair'*, LOUIS JACQUES MANDE (1789-1851), a French scientist, the inventor of the first photographic process. He was a scene-painter at Paris, and as early as 1814 his attention was directed to the subject of photographic pictures on metal. In 1833, Daguerre succeeded in perfecting the process since called *daguerreotype*. The new process excited the greatest interest. Daguerre was made an officer of the Legion of Honor, and an annuity of 6000 francs was settled on him. See DAGUERREOTYPE; PHOTOGRAPHY.

**Daguerreotype**, *da ger'o type*, the original photographic process, consisting in sensitizing a silver plate with the vapor of iodine and then placing it in a camera obscura, previously focused, and afterward developing the picture by vapor of mercury. It is then fixed by immersion in hyposulphate of sodium. After thorough washing and drying the picture is covered with glass to prevent its being rubbed off. The process is named from its inventor, Daguerre. It is now replaced by photography. See PHOTOGRAPHY.

**Dahlgren**, *dal'gren*, JOHN ADOLPH (1809-1870), an American naval officer and artilleryman. He entered the navy in 1826 and afterward served in the coast survey. In 1850 he brought forward his invention of the gun which was named for him, which was of great value during the war. Subsequently he cruised in the West

## Dahomey

Indies, and on his return to Washington he resumed command of the ordnance department, of which he was made chief in 1862. At the beginning of the Civil War he became commandant of the Washington navy yard, and in 1863 he was made rear admiral, and was placed in command of the South Atlantic blockading squadron. In 1866 he had command of the South Pacific squadron, and in 1868 he again took charge of the bureau of ordnance in Washington. In the following year he was appointed commandant of the Washington navy yard.

**Dahl'ia** (or *dale'ya*), a genus of plants belonging to the order Compositae, so called after the Swedish botanist Dahl. Dahlias are



DAHLIAS

natives of Mexico, but they are extensively cultivated in the United States and Europe, in an immense number of varieties, producing large and beautiful flowers of almost every imaginable color.

**Daho'mey**, a kingdom of West Africa on the coast of Guinea, now a French colony, having a total area of about 58,000 sq. mi. Dahomey, though generally level, has several mountain ranges and hilly regions. There are

many springs, but no rivers of any great size. The country in general is fertile and well cultivated, the chief crops being india rubber, yams and the manioc root, which forms a principal article of food. Palm oil, shea butter and cotton are other products. Among the trees are the baobab and various kinds of fruit trees, including the tamarind, yellow fig, kola and cocoanut. The inhabitants are mostly Guinea negroes, who are pagans. They worship fetishes, and human sacrifices were formerly very common. The capital of the colony has been changed from Abomey to Porto Novo. Other towns are Kotonu, which is the chief port, Grand Popo, Agoue, Say and Allada. A railroad is being constructed inland from Kotonu. In 1892 the French obtained possession of Dahomey, took the stronghold of Abomey, deposed the king and established a French protectorate. Since that time the French have extended their authority over the land to the north. Population, estimated at 1,000,000.

**Dai'rying** or **Dairy Hus'bandry**, that branch of agriculture which is given to the production of milk and its various products. Dairying has always been given some attention on farms, and in Denmark and Holland it has been the leading agricultural occupation for a long time. Dairying as a distinct occupation in the United States has developed since 1860, the year in which the first cheese factory was built.

Dairying is carried on for three purposes—selling milk, making butter and making cheese. Milk is sold to supply the consumers in cities and for the purpose of making condensed milk. It was formerly supposed that dairying could be carried on with profit only within a limited section of the country and during the summer months; but the use of scientific methods has shown that, with proper care, good butter and cheese can be made in nearly all parts of North America, and that dairying can be made profitable during the entire year. The greatest care is necessary in the selection and feeding of the cows. By means of a milk tester, the dairyman is enabled to determine the quality of milk from each cow, and by weeding out the inferior animals and supplying their places with those of higher grade, he can bring his herd to the highest standard of excellence. In summer the cows are pastured and also fed rations of some green crop or of bran and meal. In winter they are fed hay, corn, silage and bran and meal.

The by-products of milk are skim milk, butter-milk and whey. These are usually mixed with meal and fed to swine. Whey and skim milk are also used extensively in the manufacture of milk sugar.

The United States is the leading dairy country of the world. It contains about nineteen million cows, produces each year nearly one and one-fourth billion gallons of milk, makes one billion four hundred ninety-five million pounds of butter, two hundred ninety-nine million pounds of cheese and over one hundred eighty-five million pounds of condensed milk. The total value of the annual dairy products of the country is about five hundred ninety-one million dollars. See, also, *AGRICULTURE*, Vol. V.

**Dai'sy**, the name of a familiar and favorite plant in Europe, which grows commonly in all the fields and meadows.

The typical daisy is pure white and single, with a yellow or brown center, but double daisies have been produced in great variety of colors. The daisy blooms almost continuously and has already become partially naturalized in the New England States. In the United States the oxeye daisy is a species

of wild chrysanthemum, known commonly as the marguerite. In this country the name *daisy* is loosely applied to other flowers, such as the black-eyed Susan and some species of wild asters. During the age of chivalry the daisy was the emblem of fidelity and love, but in modern flower language it signifies simplicity.

**Dale**, SIR THOMAS (?–1619), a colonial governor of Virginia. He was knighted in 1606 for distinguished service in the British army and was sent to Virginia in 1611 with supplies and reinforcements for the colony. As deputy governor and later high marshal, he exercised a policy of coercion and military law which transformed the colony from a refuge for idlers and thieves into an industrious and prosperous community. His rules were known as *Dale's Code*, and his administration, from 1611 to 1616, as the "five years of slavery."

**D'Alembert**, *da lah N bair'*, (1717–1783), a French mathematician and philosopher, whose real name was Jean le Rond. He entered the



DAISY



## Dalhousie

College Mazarin at the age of twelve and studied mathematics with success. Having left college, he studied law and became an advocate, but did not cease to occupy himself with mathematics. His most important works are a treatise on dynamics and one on fluids. The scholarship and excellence of these productions caused D'Alembert to be received into the Academy of Science and into the French Academy.

**Dalhousie**, *dal hoo'zy*, JAMES ANDREW BROWN RAMSAY (1812-1860), a British statesman, tenth earl and first marquis of Dalhousie. After filling the offices of vice-president and president of the board of trade, he was appointed governor general of India (1847). He greatly extended the British Empire in India, annexing the Punjab, Oude and other native states, and developing railways and canals.

**Dallas**, TEXAS, the county-seat of Dallas co., on the Trinity river, 315 miles north of Galveston. It is an important railroad center and is connected by electric lines with Fort Worth, 32 miles west, and Sherman, 64 miles north. It is an insurance and financial center and has large trade in grain, cotton, agricultural implements, farm and mill machinery, saddlery, paper, printers' supplies, etc. It manufactures cotton-gin machinery and presses, cotton oil products, harness, furniture, cement, candies and leather goods. It has a good system of public schools and academies, medical colleges and sanitariums. It also has an abundant supply of good water and modern city conveniences. It is the home of the State Fair of Texas. Population in 1910, 92,104.

**Dallas**, ALEXANDER JAMES (1759-1817), an American politician, born in Jamaica and educated at Edinburgh and Westminster. He removed in 1783 to Philadelphia, was admitted to the bar, became prominent in his profession and was appointed secretary of the treasury by President Madison in 1814. He recommended the reincorporation of the United States Bank in 1816.

**Dallas**, GEORGE MIFFLIN (1792-1864), an American statesman, born in Philadelphia. He graduated at Princeton in 1810 and went to Russia as private secretary to Albert Gallatin, special envoy. In 1828 he was elected mayor of Philadelphia. This office he resigned to become United States district attorney. In 1831 he was sent to the United States Senate and later was minister to Russia. He was elected vice-president with Polk in 1844 and was named

## Daly

by Pierce minister to England, where he exhibited diplomatic ability of a high order.

**Dalles**, *dalz*, the name given to various rapids and cataracts in the United States. The dalles of the Columbia are about 200 miles from its mouth, where the river is compressed by lofty basaltic rocks into a roaring torrent. The rocks here present a scene of rare beauty. The dalles of the Saint Louis are a series of cataracts near Duluth, Minn., and the dalles of the Wisconsin are at Kilbourn in that state.

**Dalles**, THE, or **Dalles City**, ORE., the county-seat of Wasco co., 88 mi. e. of Portland, on the Columbia River and on the line of the Oregon Railroad & Navigation Co. This portion of the river valley is noted for the grandeur of its scenery. The principal industries are sheep and cattle raising, and grain and fruits are cultivated. The city contains flour and grist mills and wool-scouring plants and has a large trade in live stock and wool. The military post of Fort Dalles was established in 1838, and the settlement was incorporated in 1858. Population in 1910, 4880.

**Dalmatia**, *dal ma'she ah*, a province of Austria, the most southern portion of the Austrian dominions, occupying a narrow strip of land along the Adriatic Sea and covering an area of 4940 sq. mi. The inland parts of Dalmatia are diversified by hills and high mountains. There are some rich valleys, but the country is considered unproductive. The interior is occupied by a backward population, and agriculture is in a crude state. Apples, pears, peaches, apricots, oranges and pomegranates are among the fruits. On the coast, fish, especially the tunny and the sardine, abound. The trade of the country is mostly confined to the coast towns, and chief of these are Zara, the capital, Sebenico, Cattaro, Spalato and Ragusa. After passing successively through the hands of Hungarian and Venetian rulers and of the first Napoleon, Dalmatia in 1814 fell under Austrian rule. Population in 1910, 645,664.

**Dalmat'ic** or **Dalmatica**, an ecclesiastical vestment worn by the deacon at mass, so called because it was an imitation of Dalmatian costume. It is a long robe with large, full sleeves, black or red longitudinal stripes and partially unclosed sides. Bishops also wear the dalmatic under the chasuble.

**Da'ly**, JOHN AUGUSTIN (1838-1899), an American playwright. He acted for years as dramatic critic of New York newspapers and

in 1869 began his career as a theatrical manager. Some of the leading players of America were at one time or another in Daly's company, and Ada Rehan was a member of his company for years. He wrote adaptations from French and German authors and a few original plays.

**Dalzell'**, JOHN (1845- ), an American lawyer and politician, born in New York. He graduated at Yale in 1865, was admitted to the bar and gained a large practice, becoming attorney for the Pennsylvania Railroad Company and many other corporations. He was elected to Congress as a Republican in 1887 and continuously reelected for over twenty-five years, being a member of the important committees on rules and on ways and means and an acknowledged leader of his party.

**Dam**, a bank, or construction of stone, earth or wood across a stream for the purpose of keeping back the current to give it increased head, for holding back supplies of water, for flooding lands or for rendering the stream above the dam navigable by increased depth. Its material and construction will depend on its situation and the amount of pressure it has to bear. For streams which are broad and deep strong materials are required, usually stone masonry bound in hydraulic cement and a strong framework of timber. The common forms of a dam are either a straight line crossing the stream transversely, one or two straight lines traversing it diagonally, or an arc with its convex side toward the current. See IRRIGATION.

**Dam'ages**, in law, pecuniary compensation paid to a person for loss or injury sustained by him through the fault of another. It is not necessary that the act should have been a fraudulent one; it is enough that it be illegal, unwarrantable or malicious. It is becoming the common practice in both England and America to allow the damages to cover only the loss sustained, estimated at its real value, together with the expenses incurred in pressing the suit. Formerly it was the usual principle to award damages not only for actual loss, but for "retribution" or "satisfaction," as well. This is still the rule in many states in special causes.

**Damaraland**, *dā mah'ra land*, a German protectorate in South Africa, extending from the Atlantic coast to the Kalahari desert and covering an area of 100,000 sq. mi. It forms the northern part of German Southwest Africa. It is mountainous and hilly, and copper is found in the mountains. Cattle raising is the chief industry.

**Damas'cus**, a celebrated city, capital of Syria, supposed by some to be the most ancient city in the world. It is beautifully situated on a plain which is covered with gardens and orchards and watered by the Barrada. The streets are narrow, crooked and in parts dilapidated, and, except in the wealthy Moslem quarter, the houses are low, with flat-arched doors. Within, however, there is often a singular contrast, the furniture and decorations being elegant and costly. The chief buildings are the Great Mosque and the Citadel. Among the places of historical and traditional interest are the leper hospital in the house of Naaman, the house of Ananias and the place of Saint Paul's conversion. The bazaars are a notable feature of Damascus. In the midst of the bazaars stands the Great Khan, it and thirty inferior khans being used as exchanges or market places by the merchants. Damascus is an important center of trade in European manufactures; it is also a place of considerable manufacturing importance, the principal products being silk, damasks, cotton and other fabrics, tobacco, glass, soap, fine cabinet work and elegant jewelry; but the manufacture of the famous sword blades no longer exists. Damascus is one of the holy Moslem cities and continues to be thoroughly Oriental in all its features. After passing successively under the power of Israelites, Persians, Greeks and Romans, it fell at last in 1516 into the hands of the Turks. Population, estimated at 200,000.

**Damascus Steel**, a kind of steel originally made in Damascus and the East, greatly valued in the making of swords for its hardness of edge and flexibility. It is made of pure iron and steel of peculiar quality. It contains a larger proportion of carbon than ordinary steel and is produced by careful heating, laborious forging, doubling and twisting. See STEEL.

**Dam'ask**, a costly fabric of silk, linen or wool, made by weaving the weft into the warp in such a way as to make figures such as fruit, flowers, leaves and other forms. It gets its name from Damascus, the city where it was first manufactured. Linen damasks are used chiefly for tablecloths and napkins. Damasks of silk and of wool make handsome furniture coverings.

**Dam'askeen'ing**, the ornamenting of iron and steel with designs produced by inlaying or incrusting with another metal, such as gold or silver. The pattern is etched on the steel, and the other metal is filled into the etched lines.



## Damien

**Damien**, *da myahN'*, FATHER JOSEPH DE VEUSTER (1840-1889), a Roman Catholic missionary, born at Tremeloo, Belgium. He entered holy orders at the age of nineteen, and devoted his life to the cause of the Church. Having been sent on a mission to Honolulu, he learned of the terrible condition of the lepers banished to Molokai Island, and decided to devote his life to the amelioration of their condition. He went to live among them in 1873, becoming himself their physician, teacher, carpenter, magistrate and friend. In 1885 he contracted the fatal disease, but he continued his work until his death.

**Damietta**, *dah'me et'tah*, a town of Egypt, on one of the principal branches of the Nile, about 6 mi. from its mouth. It contains some fine mosques, bazaars and marble baths. Since the construction of the Suez Canal and the advancement of Alexandria, the commerce of Damietta has declined, but it has still a considerable trade with the interior, in fish and rice. Population in 1907, 29,354.

**Damocles**, *dam'o kleez*, a courtier of Dionysius, tyrant of Syracuse. Damocles declared one day that he considered the lot of Dionysius the happiest on earth, and Dionysius offered to give him a taste of the glory which he so much envied. While seated at a table surrounded by all the royal appointments, Damocles on looking up was horrified to perceive a sword suspended over his head by a single hair. Dionysius had thus made plain to him the uncertain nature of royal happiness.

**Da'mon and Pyth'ias**, two illustrious Syracusans, celebrated as models of constant friendship. Pythias had been unjustly condemned to death by Dionysius the younger, tyrant of Syracuse; and as he was obliged to leave Syracuse to arrange his affairs, his friend Damon was taken as a pledge that Pythias should return on the day fixed. Pythias, being unexpectedly detained, had great difficulty in reaching Syracuse in time to save Damon from being executed in his place, and Damon made no attempt to escape from his promise. Dionysius was so affected by the proof of their friendship that he pardoned Pythias. The Knights of Pythias, a fraternal order established in the United States, has this incident for its basis (See PYTHIAS, KNIGHTS OF).

**Damrosch**, *dahm'rosh*, LEOPOLD (1832-1885), a German-American musician, born at Posen, Prussia. He graduated in medicine at the University of Berlin and began practice at Posen,

but he soon abandoned his profession for the study of music and became a concert violinist in 1855. He later became director of orchestra in Posen and Breslau and in 1871 went to New York, where he was director of the Arion Society. He was the first to establish choral societies in New York. In 1884 he accomplished his most notable achievement in introducing and maintaining German opera in New York City. He was the author of numerous cantatas, concertos and songs, none of which displayed great genius, and was a frequent contributor to musical magazines.

**Damrosch**, WALTER JOHANNES (1862- ), an American musician and orchestra conductor, born in Germany, the son of Leopold Damrosch, also a German-American musician of note. His first important position was conductor of the oratorio and symphony societies in New York and assistant conductor of the German opera at the Metropolitan Opera House. In 1900 he conducted German opera in New York and in the following year became conductor of the New York Philharmonic Orchestra, one of the leading organizations of its kind in the country. His compositions disclose no great originality.

**Damson**, *dam'z'n*, a variety of the common plum. The fruit is naturally rather small and oval, but its numerous forms, some of which are quite large, are of different colors, black, bluish, dark purple and yellow.

**Dan** (meaning judgment). 1. One of the sons of Jacob by Bilhah. At the time of the exodus the Danites numbered 62,700 adult males, being then the second tribe in point of numbers. Samson was a member of this tribe. 2. A town in the extreme north of Palestine. This, with Beersheba in the south, gives rise to the expression "from Dan to Beersheba," meaning the land from north to south, or the entire distance between two places.

**Da'na**, CHARLES ANDERSON (1819-1897), an American journalist, born at Hinsdale, N. H. He studied at Harvard, but was obliged to leave after two years, because of ill health. He was a member of the Brook Farm association and one of the editors of a paper established in its interest. After working for other papers he joined in 1847 the New York *Tribune*, on the staff of which he remained for fifteen years. During the last two years of the war he was assistant secretary of war, and after the close of the war he started a Chicago paper, which, however, was not successful. From 1888 he

## Dana

## Dana

was editor and part owner of the *New York Sun*, and perhaps more than any other journalist his personality was identified with his newspaper. He was a man of intense prejudices and was consequently at times far from popular.

**Dana, JAMES DWIGHT** (1813–1895), an American geologist, born in Utica, N. Y. In 1850 he became professor of natural history at Yale College. He wrote *System of Mineralogy*, *Manual of Mineralogy*, *Coral Reefs and Islands*, *Manual of Geology* and *Text Book of Geology*. Dana did much to place American geology on a scientific basis and also to popularize the subject. He was recognized as the foremost American geologist.

**Dana, RICHARD HENRY** (1787–1879), an American author, born at Cambridge, Mass., and educated at Harvard College. After studying law for some time he turned his attention to literature, wrote many articles for the *North American Review* and published several collections of poems, besides two novels. His talks on Shakespeare in the *North American Review* are perhaps his most noteworthy contribution to literature.

**Dana, RICHARD HENRY, JR.** (1815–1882), an American lawyer and author, son of Richard Henry Dana, the poet. After being obliged to give up his work at Harvard College, he took a sea voyage around Cape Horn to California and published, as a result of his experiences during the voyage, *Two Years Before the Mast*, which made him an immediate reputation. He became later a lawyer and held various important official positions.

**Danaë**, *dan'a e*. See PERSEUS.

**Danbury**, *dan'ber ry*, CONN., one of the county-seats of Fairfield co., 60 mi. n. e. of New York City, on several lines of the New York, New Haven & Hartford railroad. Hat making was begun here about 1780, and about \$3,600,000 of capital is now invested in this industry. There are also manufactures of machinery, boxes, shirts, silk and silver plate ware. The city has a public library, parks and a beautiful cemetery. The place was settled in 1684 and was chartered as a city in 1889. During the Revolution supplies for the American army were stored here, and in 1777 the town was entered by General Tryon, the British governor of New York, who destroyed the stores and a large number of buildings. Population in 1910, 20,234.

**Dancing**, *dan'sing*, a form of exercise or amusement in which one or more persons make

## Dancing

a series of more or less graceful movements, with measured steps in accord with music. In its earliest forms among simple races, it is a mode of expressing strong emotions of joy and sorrow, love and rage, and even of the most solemn and impassioned religious feelings; in more civilized forms of human society it becomes a mere amusement, with no high signification whatever, or an agreeable spectacle at public entertainments. Dancing corresponds to a universal primitive instinct in man. It is still practiced by the South Sea Islanders, the forest indians of Brazil, the Zulus, the negroes of Central Africa and the native Australians, exactly as it was in the earlier stages of every civilized modern race. Ferocious war dances were practiced by savage warriors, as, for example, the North American indian braves, who worked themselves up into frantic mechanical intoxication, capable of carrying them irresistibly on to victory. The Zulu war dance is still a noble exercise for warriors, like the Pyrrhic dance of the ancient Spartans; and the dancing and whirling dervishes in the East, who work **themselves** into spasms of physical excitement, are still respected for devoutness and piety. Into savage dancing, the idea of magic always enters. Thus, the Mandan indians dance buffalo dances to bring game when supplies of food are low; the rain doctors of Central Africa dance mystic dances to bring down rain, and the wives of Gold Coast negroes dance a battle dance to give their absent husbands courage in the battle. Among the ancient historic peoples dancing was generally an expression of religious, patriotic or military feeling, as in the case of the dance of David before the ark, or the Pyrrhic dance of the Greeks. The Romans, however, like the Orientals, hired slaves to do the dancing. France took the lead in inventing modern dances. Among some of these dances were the graceful *minuet*, the favorite for a century; the *quadrille*; the *galop*, introduced from Germany; the *cotillion*, fashionable under Charles X; the *polka*, first danced at Odeon in 1840 by a dancing master from Prague; the *schottisch*, also of Bohemian origin, first brought out in Paris in 1844; the *lancers*, introduced by Laborde in 1836, and the *waltz*, originally Bavarian, which, now considerably modified from its original form, promises to maintain supremacy. Characteristic of particular races or merely of classes of people are such forms of the dance as the Scotch *reel*, *Highland fling* and *strath-*



## Dandelion

*spey*; the Irish *jig*; the negro *break-downs*; sailors' *hornpipes*; *step-dances*, *morris-dances* and the like. The *two-step* is a modern dance of American origin.

In recent years many new steps have been introduced, including the *tango*, originally danced in Argentina, and the *maxixe*, or Brazilian tango, which has some resemblance to the Argentine tango. The simplest of all modern dances is the *one-step*, which is nothing more than a walk in time to the music. The *lame duck* and the *hesitation* are danced to waltz time. There is evidence of a return to the old-fashioned waltz, but the so-called "modern" dances still have their thousands of devotees.

**Dan'deli'on**, a plant native to Europe, but now also common in America. The leaves are toothed, radiating from the crown of the root. In the spring, summer and fall, the plant blooms profusely, bearing many slender stalks, each surmounted by one large, bright yellow head of many small flowers which mature into a beautiful white ball of feathered fruits. These are transported far and wide by the wind. The whole plant is full of a milky and bitter juice. Some species have powerful medicinal properties, and the young leaves of all are often used for greens and salads.



DANDELION

**Daniel**, the prophet, a contemporary of Ezekiel, was born of a distinguished Hebrew family. In his youth, 605 B. C., he was carried captive to Babylon and was educated in the court of King Nebuchadnezzar. Thrown into the lions' den for conscientiously refusing to obey the king, he was miraculously preserved and was finally made prime minister by the Persian king Darius. (*Dan.* I, II, IV-VI.)

**Dan'iel Battery**, a galvanic battery, the cells of which were originally constructed as follows: A tall cylindrical copper vessel was nearly filled with a strong solution of sulphate of copper (blue vitriol). A rod of amalgamated zinc was enclosed in a skin or bladder, which was filled with dilute sulphuric acid and was suspended in a copper cylinder. When the zinc

## Dante

rod was connected by wire with the copper vessel, the current passed from the copper through the wire to the zinc. The modern Daniell battery consists of a glass jar in which is placed a porous cup containing zinc. This cup is enclosed in a copper cylinder having an opening on one side for the free circulation of the liquid. Dilute sulphuric acid is placed in the cup containing the zinc, and a solution of sulphate of copper is placed in the jar. A small porous vessel filled with sulphate of copper is also placed in the jar, to maintain the strength of the solution. The sulphuric acid in the porous cup unites with the zinc, and the copper sulphate in the jar is decomposed and deposits its copper on the copper cylinder. These chemical changes produce a current of electricity which flows from the copper to the zinc. The Daniell battery in various forms is in general use in telegraph stations and for other purposes where a continuous working battery producing a low current is desired.

**Dan'ish West In'dies.** See WEST INDIES, DANISH.

**Dan'te Alighieri** (1265-1321), the greatest poet of Italy and one of the greatest poets of the world, was born in Florence of a family which probably belonged to the lower nobility. Of his youth and education nothing definite is known, although it may be that he studied with the learned Brunetto Latini. He was but a boy of nine years when he first saw Beatrice Portinari, and the love she awakened in him he has described in that record of his early years, the *New Life*, as well as in his later great work, the *Divina Commedia*. In 1291, the year after the death of Beatrice, Dante married Gemma Donati, by whom he had several children. Soon after this time the Guelphs in Florence became divided into the rival factions of Bianchi and Neri (Whites and Blacks), the latter an extreme papal party, the former a moderate party which wished for reconciliation with the Ghibellines. Dante's sympathies were with the Bianchi, and when, in 1302, the opposite party gained control, Dante was banished with many of his fellows. The poet remained an exile to the end of his life; and his history during this time is semi-mythical. He is said to have visited many cities, Arezzo, Bologna, Sienna and even Paris, and in 1320 he certainly stayed at Ravenna, with his friend Guido da Polenta. He was buried at Ravenna, where his bones still lie.

Dante's great poem, the *Divine Comedy*,



## Dante

written in great part, if not altogether, during his exile, is divided into three parts, entitled *Hell*, *Purgatory* and *Paradise*. The title *Comedy* was given to it, in accordance with the standards of the time, because it begins with



DANTE ALIGHIERI

horrible scenes and ends cheerfully. The epithet *Divine* was added by others.

The poet dreams that he has wandered into a dusky forest, when the shade of Vergil appears and offers to conduct him through hell and purgatory. Further the pagan poet may not go, but Beatrice herself will lead him through paradise. Dante with marvelous imaginative power gives brief life histories of the famous guilty ones—pope and Ghibelline, Italian lord and lady—often in his severe style compressing the story into two or three lines, but always picturing guilt and punishment with passionate force, subtle insight and intense religious faith. From hell, the poet, still in the company of Vergil, ascends to purgatory, where the scenes are similar, though the punishments are only temporary. In the earthly paradise above purgatory, Dante beholds Beatrice in a scene of surpassing magnificence, ascends with her into the celestial paradise, and after roaming over seven spheres he reaches the eighth, where he beholds “the glorious company, which surrounds the triumphant Redeemer.” In the ninth Dante feels himself in the presence of the

## Danville

Divine essence, and sees the souls of the blessed on thrones in a circle of infinite magnitude. The Deity himself, in the tenth, he cannot see for excess of light. Dante’s great poem, which has no rival in the work of any one man, has been feelingly translated by scholarly men into many languages.

**Danton**, *dahN tohN’*, GEORGES JACQUES (1759–1794), one of the leaders in the French Revolution. He was foremost in organizing and conducting the attack on the Tuileries, August 10, 1792, voted for the capital punishment of all returning aristocrats and for the death of the king, and with Robespierre brought Hébert and his followers to the scaffold. Robespierre succeeded in having Danton denounced and thrown into prison because he had dared to counsel moderation, and he was afterward condemned by the revolutionary tribunal as an accomplice in a conspiracy for the restoration of monarchy, and was executed.

**Dant’zic**. See DANZIG.

**Dan’ube**, a celebrated river of Europe, which originates in two small streams, rising in the Black Forest, in Baden, and uniting at Donaueschingen. The direct distance from source to mouth of the Danube is about 1000 miles, and its total length, including windings, about 1670 miles. From its source the Danube flows in a northeasterly direction to Ulm, in Württemberg, where it becomes navigable for vessels of 100 tons; then to Ratisbon, in Bavaria, where it becomes navigable for steamers. Here it turns in a southeasterly direction, entering Austria at Passau, passing Vienna and Budapest, above which it suddenly turns due south, holding this direction till it is joined by the Drave, after which it runs southeasterly and enters Servia at Belgrade. Continuing its general course eastward, it forms for a long distance the boundary line between Rumania and Bulgaria. At Silistria it once more turns northward, and flowing between Rumania and Bessarabia it falls into the Black Sea by three different outlets.

**Dan’vers**, MASS., a town in Essex co., 19 mi. n. e. of Boston, on the Boston & Maine railroad. It has manufactures of shoes, leather, brick and lumber and contains a public library, a large state hospital for the insane and the Saint John’s Normal College. Danvers was a part of Salem until 1756. Population in 1910, including several villages, 9407.

**Dan’ville**, ILL., the county-seat of Vermilion co., 123 mi. s. of Chicago, on the Ver-



## Danville

million River and on the Wabash, the Chicago & Eastern Illinois, the Big Four and other railroads. Coal mining is the chief industry, and the city contains foundries, woolen mills, glass works and brick yards. It has a Carnegie Library, a Y. M. C. A. building, three national banks, three public parks and a national soldiers' home. The place was settled about 1830 and was incorporated in 1867. Population in 1910, 27,871.

**Danville, VA.**, a city of Pittsylvania County, 140 mi. s. w. of Richmond, on the Dan River and on the Southern and the Danville & Western

## Dardanelles

ammunition. The proper port of Danzig is Neufahrwasser, at the mouth of the Vistula. Danzig is mentioned in historical accounts as early as the tenth century. After being alternately possessed by the Teutonic knights and the Poles, Danzig fell to Prussia in 1795. Population in 1910, 170,347.

**Dardanelles**, *dahr da nelz'* (ancient Hellespont), a narrow channel, which connects the Sea of Marmora with the Aegean Sea, and at this particular point separates Europe from Asia. It is about forty miles in length and varies in



THE APPROACHES TO CONSTANTINOPLE  
Showing the Dardanelles, the Sea of Marmora and the Bosphorus, with important cities.

railroads. The city has a beautiful location, is in a region producing a very fine quality of tobacco, is the second largest leaf tobacco market in America and contains about forty tobacco factories. The river furnishes good water power, and there are large cotton works, flour and grist mills and other factories. It is the seat of the Roanoke Female College, Randolph-Macon Institute for Young Ladies and the Danville Military Institute. The place was settled in 1792. It was for a short time the seat of the government of the Southern Confederacy in 1865. Population in 1910, 19,020.

**Danzig or Dantzic**, *dahn'tsiK*, a fortified town and port in Prussia, capital of the province of West Prussia, 285 mi. n. e. of Berlin, on the Vistula, about 3 mi. above its mouth. It is one of the most important seaports in the Prussian monarchy. Among the principal buildings are the Dom or Cathedral, begun in 1343; the Church of Saint Catharine; the fine old Rathaus; the exchange; the arsenal; an observatory; three monasteries; two synagogues and two theaters. The prosperity of the town is founded chiefly on its transit trade. The principal trade is in grain, timber and sugar. There are government establishments for the manufacture of arms and

breadth from one to four miles. A rapid current, often much increased by winds, runs southward. On the Asiatic side the country presents beautiful scenery, rising gradually upward from the sea to the range of Mount Ida; the European side is steep and rugged, but is densely peopled and highly cultivated. On both shores are numerous forts and powerful batteries. Two castles on the opposite shores are near the sites of ancient Sestos and Abydos, and recall the story of Hero and Leander. By a treaty made in 1841 between the five great powers and Turkey, confirmed by the Peace of Paris in 1856, it is settled that no foreign man-of-war shall pass the strait without the express permission of the Turkish government. During the War of the Nations the Allies made desperate attempts to force a passage through the Dardanelles to Constantinople. In February and March, 1915, an allied fleet bombarded the forts at the entrance, and in April an army was landed on the Gallipoli Peninsula, but with heavy losses. The heroism of the soldiers and the sacrifice of thousands of lives were not enough to drive back the Turks, and after eight terrible months the allied forces withdrew from the peninsula. See WAR OF THE NATIONS.

## Darien

**Darien'**, GULF OF, a gulf of the Caribbean Sea, at the north extremity of South America, between the Isthmus of Panama and the mainland. The chief river flowing into it is the Atrato

**Darien**, ISTHMUS OF. See PANAMA, ISTHMUS OF.

**Darien Scheme**, a celebrated financial project set afloat by a Scotchman, William Patterson, whose purpose was to form a settlement on each side of the Isthmus of Darien, in order to control the trade between the eastern and western hemispheres. Nearly \$4,000,000 was subscribed, fully half of it in Scotland, and in 1698 twelve hundred Scotch colonists sailed for the isthmus. Disease and famine, however, caused them to desert their settlement and return to Scotland in June, 1699. Two other companies of about the same size also attempted to establish settlements at Darien, with equally unfortunate results. The whole affair was one of the most disastrous financial enterprises in history.

**Dari'us I** (550-485 B. C.), a Persian king who attained the throne in 521 B. C. One of his first acts was to divide his empire into twenty satrapies, with a governor over each. He reduced, after a two years' siege, the revolted city of Babylon, and led an expedition of seven hundred thousand men against the Scythians on the Danube. The Greeks had aided the Ionians in their struggle to free themselves from Persia, and Darius therefore sent an army under Mardonius to invade Greece. But the ships of Mardonius were destroyed by a storm in doubling Mount Athos, and his army was cut to pieces by the Thracians. Darius, however, fitted out a second expedition, which was met on the plains of Marathon by an Athenian army under Miltiades and completely defeated (490 B. C.). Darius had determined on a third expedition, when he died in 485.

**Darius III**, the twelfth and last king of Persia. He ascended the throne in 336 B. C., when the kingdom had been weakened by luxury and the tyranny of the satraps and could not resist the attacks of Alexander of Macedon; and the army of Darius was totally routed on the banks of the Granicus, in Asia Minor. Darius then hastened to meet Alexander in the mountainous region of Cilicia and was a second time totally defeated near the Issus. Two years afterward, all proposals for peace having been rejected by Alexander, Darius collected another army, met the Macedonian forces between

## Darling River

Arbela and Gaugamela, and was again routed. Alexander captured Susa, the capital, and Persepolis, and reduced all Persia. Meanwhile, Darius was collecting another army at Ecbatana in Media, when a traitorous conspiracy was formed against him, by which he lost his life, in 330 B. C.

**Dark Ages**, a term used to designate the period extending from about the fall of the Roman Empire, in 476, to the revival of learning, in the twelfth century. Sometimes the words are understood to mean the entire Middle Ages. See MIDDLE AGES.

**Dar'ley**, FELIX OCTAVIUS CARR (1822-1888), an American artist, born in Philadelphia. While a clerk in a mercantile house in Philadelphia he produced some humorous sketches which were so highly praised that he devoted himself to the pursuit of art by making drawings for engravers. In 1848 he went to New York City. His illustrations for books were almost innumerable. The works of Cooper, Longfellow, Hawthorne, Shakespeare and Dickens were illustrated by Darley.

**Dar'ling**, GRACE HORSLEY (1815-1842), a celebrated English heroine. In 1838 the steamer *Forfarshire*, with forty-one passengers on board, besides her crew, became disabled off the Farne Islands during a storm and was thrown on a rock, where she broke in two, part of the crew and passengers being left clinging to the wreck. Next morning William Darling descried them from Longstone Lighthouse, about a mile distant, but he shrank from attempting to reach the wreck through a boiling sea in a boat. His daughter Grace, however, implored him to make the attempt and let her accompany him. At last he consented, and, father and daughter each taking an oar, they reached the wreck and succeeded in rescuing nine sufferers. The news of the heroic deed soon spread, and the brave girl received testimonials from all quarters. A purse of \$3,500 was publicly subscribed and presented to her. Four years afterward she died of consumption.

**Darling Range**, a range of mountains extending in a northerly direction in western Australia. They are parallel with the coast, and the range has a length of about three hundred miles. They are low mountains, the highest peak not exceeding 1500 feet.

**Darling River**, a river which rises in the northeast part of New South Wales, Australia, flows in a southwesterly and southerly direction and joins the Murray.



## Darmstadt

**Darmstadt**, *dahrm'staht*, a town in Germany, capital of the grand duchy of Hesse, situated 15 mi. s. of Frankfort. Among the remarkable buildings are the old grand-ducal palace, containing one of the largest libraries in Germany, the Catholic church, and the Rathaus, or townhall, built in 1580. Darmstadt is a busy manufacturing town. There are iron foundries, breweries, machine shops and various factories. The town is also an important railway center. In 1330 it secured municipal rights, and in 1567 it became the capital of Hesse. It was burned by the French in the seventeenth century, but afterwards rapidly rose in importance. Population in 1910, 87,085.

**Dar'nel**, the popular name of a species of poisonous grass. It appears to be the tares of Scripture. Its properties are said to be narcotic and stupefying, but recent researches have cast some doubt on its reported injurious qualities. It is met with in cornfields and is now naturalized in North America.

**Darning Needle.** See DRAGON FLY.

**Darn'ley**, HENRY STUART, Lord (1545–1567), son of the earl of Lennox and Lady Margaret Douglas, a niece of Henry VIII. In 1565 he was married to Mary Queen of Scots. It was an unfortunate match; Mary was disgusted at his coarseness and could not long conceal her contempt. His part in the murder of Rizzio angered Mary still further, and when, on February 9, 1567, the house in which he lay recovering from an illness was blown up by gunpowder, Mary was suspected of complicity in the crime. Although the earl of Bothwell was certainly concerned in the crime, he escaped punishment. See BOTHWELL, JAMES HEPBURN, Earl of; MARY STUART.

**Dar'rah**, MRS. LYDIA, a famous American heroine. She was a Quaker and resided in Philadelphia. When the British army was there the adjutant general hired one of her rooms for private conferences. On Dec. 2, 1777, some particular and emphatic directions were given that excited her curiosity. She listened at the door of the meeting room and heard an order read that the British soldiery should march out of camp on December 4 to attack the Americans then quartered eight miles distant. On the following morning she walked several miles on the snowy ground and approached the American camp. Here she met Colonel Craig and gave him the information. When the British arrived, they found the army of Washington prepared to meet

## Dartmouth College

them at all points, and the enterprise miscarried.

**Dart'er** or **Snake Bird**, a web-footed bird related to the cormorant and found near the eastern coasts of the tropical parts of America and the western coast of tropical Africa, as well



DARTER

as in Australia. It is the habit of these birds to perch on trees by the water side and, after hovering an instant over the water, suddenly to dart at their prey with unerring aim. Their necks are long and snake-like, the head being scarcely thicker than the neck, and from this fact they get the second name given above.

**Dartmouth**, *dahrt'muth*, **College**, an educational institution of collegiate grade, situated at Hanover, N. H. The college is the outgrowth of an indian school which was opened in 1754 and was founded by Rev. Eleazar Wheelock. The institution was named from the earl of Dartmouth, who was one of the principal contributors and the first president of the board of trustees. The college began its existence in the midst of the wilderness, and the only buildings for several years were log huts, but it continued to increase in numbers and influence until it became one of the leading colleges of the country. Later, a religious controversy caused the state legislature to create a new corporation, which, without consent of the old board of trustees, assumed control of the college. This led to what is known as the Dartmouth College Case (See DARTMOUTH COLLEGE CASE). The college still remains an institution for men only. It maintains the following departments: classical, medical, the Chandler School of Science, the Thayer School of Civil Engineering and the Tuck School of Commerce and Finance. There are about two hundred in the faculty, and the average

## Dartmouth College Case

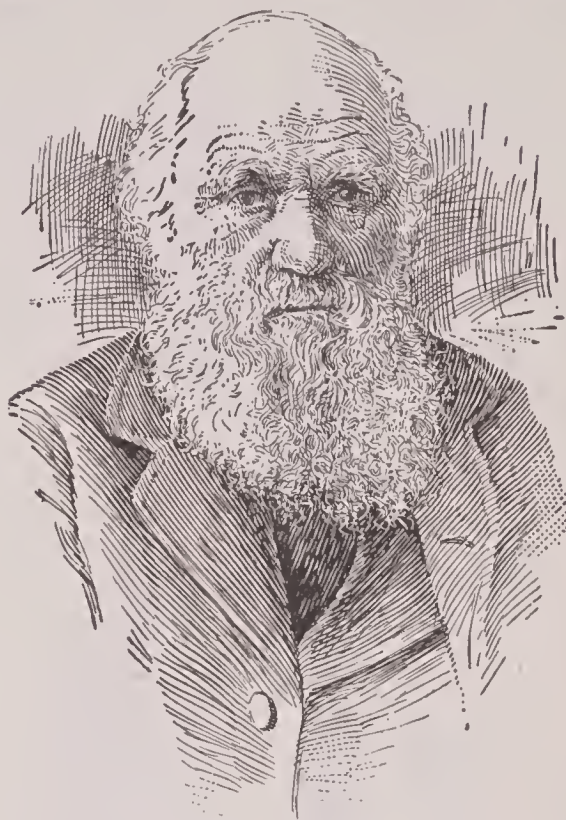
enrollment is 1200. The library contains 100,000 volumes, and the value of the property, including endowments, is \$3,200,000.

**Dartmouth College Case**, the name given to a famous case arising from a suit instituted by the trustees of Dartmouth College for the purpose of recovering control of the college and property, which had been taken from them by act of the New Hampshire legislature in 1816. Dartmouth College was founded by a charter granted by George III in 1769. When the independence of the United States was established, the State of New Hampshire assumed the position occupied by the throne under the colonial government. Some years later the legislature created a new corporation for the college, making certain changes in its management. The college appealed to the courts, but lost its suit, and then appealed to the United States Supreme Court, where its case was argued by Daniel Webster. The Supreme Court, in a decision handed down by Chief Justice Marshall, declared that the legislature did not have authority to legislate the old charter out of existence, or to pass laws violating its provisions, by reason of the clause in the United States Constitution which establishes the inviolability of contracts.

**Darwin**, CHARLES ROBERT (1809-1882), a noted English naturalist. He early devoted himself to the study of natural history, and in 1831 he was appointed naturalist to the surveying voyage of H. M. S. *Beagle*, commanded by Captain Fitzroy. Darwin came home with rich stores of knowledge, part of which he soon gave to the public in various works. In 1859 his name attained its great celebrity by the publication of *The Origin of Species by Means of Natural Selection*. This work, scouted and derided though it was at first in certain quarters, may be said to have worked nothing less than a revolution in biological science. In it for the first time was given a full exposition of the theory of evolution as applied to plants and animals, the origin of species being explained on the hypothesis of natural selection. This theory is now generally accepted by the prominent scientists, though modified and improved in many of its details. The rest of his works are largely based on the material he had accumulated for the elaboration of this great theory. The principal ones are a treatise on the *Fertilization of Orchids*; *Domesticated Animals and Cultivated Plants*; *Descent of Man and Variation in Relation to Sex*; *The*

## Date

*Expression of the Emotions in Man and Animals*; *Movements and Habits of Climbing Plants*; *Insectivorous Plants*; *Cross and Self*



• CHARLES DARWIN

*Fertilization*; *The Power of Movement in Plants*, and *The Formation of Vegetable Mold*. See EVOLUTION.

**Das'kam**, JOSEPHINE DODGE. See BACON, JOSEPHINE DASKAM.

**Dasyure**, *dase'ure*, a genus of animals, allied to the opossums, that carry their young in pouches. The ursine dasyure of Tasmania is about the size of a badger, but of a sturdier form and of a dull black color. It feeds on flesh and has a savage temper. Formerly it was most destructive to flocks and poultry yards, but is now seldom found in the inhabited districts.

**Date**, the fruit of the date palm, or the tree itself. The fruit is used extensively as an article of food by the natives of northern Africa and of some countries of Asia. It consists of a fleshy coat, separable into three portions, and covering a hard, horny seed. Next to the cocoanut palm, the date is unquestionably the most interesting and useful of the palm tribe. Its stem shoots up to the height of fifty or sixty feet, without branch or division, and is of nearly the same thickness throughout its length. From the summit it throws out a magnificent crown of large, feather-shaped leaves, besides a number



## Date Plum

of stalks, each of which in the female plant bears a bunch of from 180 to 200 dates, each bunch weighing from twenty to twenty-five pounds. The fruit is eaten fresh or dried.



DATE PALM

Cakes of dates pounded and kneaded together are the food of the Arabs who traverse the deserts. A liquor resembling wine is made from dates by fermentation.

**Date Plum**, the name given to several different trees of the ebony family. The European date plum is a low-growing tree, native of the south of Europe, that produces a small edible fruit. The Chinese date plum is cultivated for the sake of its fruit, which is about the size of a small apple and is made into a preserve. See PERSIMMON.

**D'Aubigne**, *do be nyay'*, JEAN HENRI MERLE. See MERLE D'AUBIGNE, JEAN HENRI.

**Daudet**, *do da'*, ALPHONSE (1840-1897), a French novelist, born at Nîmes. He went to Paris in 1857 to seek his fortune, but his collections of poems failed to win any attention, and his plays met with little better reception.

## Davenport

When he discovered his powers as a story-teller, however, his success was assured. The volumes of short stories, *Letters from My Mill* and *Monday Tales*, established his reputation, which was rendered more secure by each novel which he published. *Numa Roumestan* and *The Nabob* are probably his greatest works, although many readers find *Tartarin of Tarascon* the most attractive. Daudet himself regarded *Sapho* as the best of his writings.

**Daughters of the American Revolution**, a patriotic society, organized in Washington, D. C., in 1890. Only those women whose ancestors fought upon the American side in the Revolutionary War are admitted to membership. Its purpose is the fostering of reverence for the achievements of the Revolutionary heroes and the collection of relics and the erection of monuments. There are chapters in almost all the states and territories and in Canada, Hawaii and Europe. Its membership of eighty thousand is divided among seven hundred local chapters. The society owns a beautiful memorial hall in Washington, completed early in 1910.

**Dauphin**, *daw'fn*, the title of the eldest son of the king of France, prior to the revolution of 1830. The name was assumed toward the middle of the ninth century by the lord of Dauphiny, which province was bequeathed by Humbert II to the king of France in 1349, on condition that the heir of the throne should bear the title of Dauphin of Vienne and should govern the province.

**Dav'enport**, IOWA, the county-seat of Scott co., situated on the Mississippi River, 330 mi. above Saint Louis, 183 mi. w. by s. of Chicago, and opposite Rock Island, Ill. It is on the Chicago, Rock Island & Pacific, the Chicago, Milwaukee & Saint Paul, the Chicago, Burlington & Quincy and a number of other railroads. The city is built upon the sides of a bluff and has a beautiful location overlooking a wide extent of country. It is connected with Rock Island by a railroad bridge and a combined wagon and railroad bridge. The important buildings include the Saint Luke's and Mercy hospitals, two opera houses, a public library, a commercial club building and a number of excellent business blocks. Among the educational institutions are the Academy of the Immaculate Conception, Saint Ambrose College and Saint Katherine's Hall. The leading church edifices are the Protestant Episcopal and Roman Catholic cathedrals, Saint John's Methodist Church and

## Davenport

the Kirkwood Presbyterian Church. The Iowa Soldiers' Orphans' Home is also located here. The city has a large trade in farm produce and is the seat of a number of extensive industries, including meat packing, manufactories of flour, lumber, wagons, carriages, farming implements and machinery, locomotives, pumps, steel cars and soap. The city has eleven banks. Davenport was founded in 1835 and was named for Colonel George Davenport, the leader of the company forming the first settlement. It was incorporated as a town in 1838 and as a city in 1851. Population in 1910, 43,028.

**Davenport, FANNY LILY GIPSY** (1850-1898), an American actress, born in London, but educated in Boston. She was only seven years old when she first appeared on the stage and was but twelve when she made her formal debut in *Faint Heart Never Won Fair Lady*. After playing for a short time in Mrs. Drew's theater in Philadelphia, she became connected with Augustin Daly's company in New York. Among her most famous productions are *Fedora*, *Cleopatra* and *La Tosca*.

**Da'vid**, king of Israel, the youngest son of Jesse, a citizen of Bethlehem, and descended through Boaz from the ancient princes of Judah (*I* and *II Sam.*; *I Chron.*). He reigned from 1055 B. C. to 1015 B. C., according to the usual chronology, but recent investigations put the dates from thirty to fifty years later. Under David the empire of the Israelites rose to the height of its power, and his reign has always been looked on by the Jews as the golden age of their nation's history.

**David, JACQUES LOUIS** (1748-1825), founder of the modern French school of painting. He went to Rome in 1774, and passed several years there painting important pictures. A second visit produced the *Horatii*, one of his greatest works. He was appointed first painter to Napoleon about 1804; and after the second restoration of Louis XVIII he was included in the decree which banished all regicides from France, when he retired to Brussels. Most of his paintings are executed according to the strict rules of art, without any attempt at expression, naturalness or sentiment. The best examples of his work are *Coronation of Napoleon I*, *The Death of Socrates*, *Belisarius Asking Alms* and *Three Fates*.

**David, PIERRE JEAN** (1789-1856), a French sculptor, born at Angers, called David of Angers, to distinguish him from the painter David. He studied sculpture first at Paris and later at

## Davis

Rome, where he became associated with Canova and Thorwaldsen. In 1831 he began the magnificent sculptures of the Pantheon, his most important work, which he finished in 1837. He executed a great number of medallions, busts and statues of celebrated persons of all countries. Among his best statues are those of *Madame de Staël*, *Talma*, *Corneille* and *Lafayette*.

**Davies, da'viz, LOUIS HENRY, Sir** (1845- ), a Canadian statesman, born at Charlottetown, Prince Edward's Island, educated at Prince of Wales College in Charlottetown and admitted to the bar in 1866. Ten years later he became premier and attorney general of the province of Prince Edward's Island. From 1882 to 1901 he was a Liberal member of the House of Commons; he resigned to become a justice of the Dominion supreme court.

**Da'vis, CUSHMAN KELLOGG** (1838-1901), an American statesman, born at Henderson, N. Y., and educated at the University of Michigan. He was admitted to the bar in 1860, but on the breaking out of the Civil War he enlisted as a private. He left the army at the end of two years with the rank of captain. In 1864 he began to practice law in Saint Paul, was elected governor of Minnesota in 1873 and United States senator in 1887, which position he held during the remainder of his life. He was for many years chairman of the committee on foreign relations and was a member of the peace commission which concluded the treaty with Spain.

**Davis, DAVID** (1815-1886), an American jurist, born in Cecil County, Md. He graduated from Kenyon College, Ohio, studied law in Massachusetts and Connecticut, and removed to Illinois in 1835. In 1844 he was a member of the state legislature, and in 1848 was made United States circuit judge. In October, 1862, President Lincoln appointed him associate justice of the Supreme Court. Judge Davis was nominated by the labor reformers for president in 1872, but he usually affiliated with the Democratic party. In March, 1877, he resigned to enter the United States Senate.

**Davis, HENRY WINTER** (1817-1865), an American statesman, born in Annapolis, Md., and educated at Kenyon College and the University of Virginia. He began the practice of law at Baltimore. He was in Congress from 1855 to 1861 and again from 1863 to 1865. Although representing a slave state, he was a strenuous advocate of emancipation and negro suffrage.



**Davis, JEFFERSON** (1808–1889), an American statesman, president of the Confederate States of America. He was born in Kentucky, but at an early age he went with his parents to Mississippi, where he received his early education. He entered West Point Military Academy, graduating in 1828, and for seven years he saw important service on the frontier. In 1835 he became a cotton planter and he was elected to Congress in 1845, where he was an ardent follower of Calhoun. At the commencement of the Mexican War he left Congress and entered the contest as colonel of a regiment, performing distinguished service. He entered the



JEFFERSON DAVIS

Senate in 1847 and became the leader of the Southern party in the slavery and states' rights controversy. Davis was secretary of war during Pierce's administration and while holding this position introduced several marked improvements in military tactics, coast defense, armament and transportation. Upon the secession of Mississippi, he retired from the Senate, delivering a notable farewell address, and in the same year was elected president of the Confederate States. During the war he acted with good judgment, dignity and devotion to principle and was especially anxious to mitigate the suffering and sorrow caused by the war.

He was taken prisoner soon after the fall of Richmond and was confined in Fortress Monroe for two years, but was liberated by the general amnesty of 1868. During his last years Mr. Davis resided in Memphis and Mississippi, dying in New Orleans. In 1831 he published *The Rise and Fall of the Confederate Government*, giving his view of the controversy. His remains were removed from New Orleans and interred at Richmond in 1893.

**Davis, NATHAN SMITH** (1817–1904), an American physician, editor and professor in Northwestern University Medical School, of which he was a founder. Several other important societies and institutions owe their origin to him. Among his publications are *A History of Medical Education and Institutions in the United States*, *Clinical Lectures*, *Effects of Alcoholic Drink* and *A History of the American Medical Association*.

**Davis, REBECCA HARDING** (1831–1910), an American novelist, born in Washington, Pa. She first became known for the gloomy power of a story, *Life in the Iron Mills*, published (1861) in the *Atlantic Monthly*. She married L. Clarke Davis, editor of the *Philadelphia Inquirer*, and much of her brilliant talent went into journalistic work which will not be preserved. She introduced the labor question into American fiction. Among her novels are *Dallas Galbraith* and *A Law unto Herself*.

**Davis, RICHARD HARDING** (1864–1916), an American novelist and journalist, the son of Rebecca Harding Davis, born at Philadelphia. He was educated at Lehigh and Johns Hopkins universities, and began literary work as a newspaper reporter in Philadelphia. After serving for a time on the staff of the *New York Evening Sun*, he became managing editor of *Harper's Weekly*. This position he held but a short time. *Gallegher and Other Stories*, published in 1891, first gained him wide attention, and from that time he held his audience by the interest of his narratives and the vigor of his style. Among his other books are *Van Bibber and Others*, *Cuba in War Time*, *The Cuban and Porto Rican Campaign*, *With Both Armies in South Africa*, and the novels *The Princess Aline*, *The King's Jackal*, *Soldiers of Fortune* and *Ransom's Folly*.

**Davis Strait**, a narrow sea which separates Greenland from Baffin Land, and unites Baffin Bay with the Atlantic Ocean. It is from 180 to 500 miles wide and was discovered in 1585 by John Davis, after whom it was named.

**Da'vitt**, MICHAEL (1846–1906), an Irish political leader. In 1870 he was sentenced to fifteen years' imprisonment for bringing arms into Ireland, but he was released in 1878. The next year he founded the Irish Land League, which soon spread over the entire country. He made a tour of the United States on behalf of that organization in 1880; and on his return to England he was again arrested on his old sentence and was held in prison for fifteen months. While in prison he was repeatedly elected to Parliament, but was disqualified. He was later elected twice without opposition, but resigned in 1899.

**Da'vy**, HUMPHRY, Sir (1778–1829), a distinguished English chemist and natural philosopher. He was appointed professor of chemistry in the Royal Institution at the age of twenty-four. In 1803 he was chosen a member of the Royal Society. His discoveries with the galvanic battery, his decomposition of the earths and alkalies and the ascertaining of their metallic bases obtained him an extensive reputation. From his investigation of firedamp in mines, he was led to the invention of a safety lamp, which has rendered the mines comparatively free from explosions and thus prevented the death of thousands of workmen.

**Dawes**, *dawz*, HENRY LAURENS (1816–1903), an American statesman, born in Cummington, Mass. He graduated at Yale College and studied law. After serving as a member of the House of Representatives for seven consecutive terms, in 1874 he was elected United States senator from Massachusetts, being reelected in 1881 and 1887. He was a special student of Indian affairs, was at the time of his death commissioner of the Five Civilized Tribes and performed important service in protecting them against fraud and dishonesty.

**Daw'son**, a port in Canada, the capital of the Yukon district in the Northwest Territories, on the right bank of the Yukon River, 330 mi. n. n. w. of Skagway, and on the line of the Pacific & Arctic Railway & Navigation Company. There are several churches, schools, hotels and theaters. Dawson is the center of the Klondike gold mining region. Its origin dates from the discovery of gold on Bonanza Creek in 1896. Coal deposits have been found in the neighboring region, but the city has gradually declined since the early boom days. Population in 1911, 4000.

**Dawson**, GEORGE MERCER (1849–1901), a Canadian geologist and explorer, born in Truro,

N. S., educated at McGill University and the Royal School of Mines, London, Eng. He became a member of the staff of the Geological Survey in 1875, and was its director in 1895. He explored a large portion of the western country and made the mineral resources of the region known to the Canadian government. He was a member of the Bering Sea Commission of 1891.

**Dawson**, JOHN WILLIAM, Sir (1820–1899), a Canadian geologist and educator. He received his education at Edinburgh University and at an early age turned his attention to geology. In 1842 he accompanied Sir Charles Lyell on an expedition to examine the geology of Nova Scotia. In 1850 Dawson became superintendent of education for Nova Scotia, and five years later he was made principal and professor of geology in McGill University, Montreal, and later vice-chancellor. He was elected president of the American Association for the Advancement of Science in 1882 and four years later became president of the British Association for the Advancement of Science. Among his many contributions to the literature on science are *Acadian Geology*; *The Story of the Earth and Man*; *The Origin of the World*; *Egypt and Syria*; *Modern Ideas of Evolution*, and *The Change of Life in Geological Time*.

**Day**, either the interval of time during which the sun is continuously above the horizon, or the time occupied by the revolution of the earth on its axis, embracing the period of darkness as well as the interval of daylight. The day in the latter sense may be measured in more than one way. If we measure it by the apparent movement of the stars, caused by the rotation of the earth on its axis, we must call day the period between the time when a star is on the meridian and when it again returns to the meridian; this is a *sidereal* day. It is uniformly equal to 23 hours, 56 minutes, 4.098 seconds. But more important than this is the *solar* day, or the interval between two passages of the sun across the meridian of any place. The latter is about four minutes longer than the sidereal day, owing to the revolution of the earth round the sun, and it is not of uniform length, owing to the varying speed at which the earth moves in its orbit and to the obliquity of the ecliptic. For convenience, an average length of the solar day is taken, and this gives us the *mean solar* or *civil* day of twenty-four hours, the difference between which and the actual solar day at any time is the *equation of*



*time.* The length of the days and nights at any place varies with the latitude and season of the year, owing to the inclination of the earth's axis. In the first place, the days and nights are equal all over the world on the 21st of March and the 21st of September, which dates are called the *vernal* (spring) and *autumnal equinoxes*. Again, the days and nights are always of equal length at the equator, which, for this reason, is sometimes called the *equinoctial* line. With these exceptions, we find the difference between the duration of the day and the night varying more and more as we recede from the equator.

The Babylonians began the day at sunrise; the Jews at sunset; the Egyptians and Romans at midnight, as do most modern peoples. The civil day in most countries is divided into two portions of twelve hours each. The abbreviations P. M. (post meridiem), afternoon, and A. M. (ante meridiem), forenoon, indicate these divisions. The Italians in some places reckon the day from sunset to sunset and enumerate the hours up to twenty-four; the Chinese divide it into twelve parts of two hours each. For astronomical purposes the day is divided into twenty-four hours, instead of two parts of twelve hours. Formerly the English day began at noon, but since Jan. 1, 1885, the day of twenty-four hours begins at midnight at Greenwich observatory; and this reckoning is now generally adopted for astronomical purposes throughout the world. At midday at Greenwich the date (day of the week and month) is everywhere the same, though there are all possible differences in naming the hour of the day. But midday at Greenwich is the only instant at which we ever have the same date all over the world. The meridian of midnight, which is then at 180° east or west, goes on revolving, gradually bringing a new date to every place to the west of that line, but obviously not bringing that new date to the places immediately to the east of that line till twenty-four hours after. From this it follows that whereas places on the same side of the globe never have a different date except when midnight lies between them, places on opposite sides of the globe and on different sides of the meridian of 180° never have the same date except when midnight lies between them.

**Day**, WILLIAM RUFUS (1849- ), an American jurist and statesman, born at Ravenna, Ohio. He graduated at the University of Michigan in 1870 and was admitted to the bar

two years later. He practiced law at Canton, Ohio, until 1886 and was appointed to several important positions on the bench. Judge Day became first assistant secretary of state in April, 1897, and was made secretary of state upon the resignation of John Sherman in April, 1898. This position he resigned to act as chairman of the Spanish-American Peace Commission. He was appointed United States circuit judge by President McKinley in 1899 and was made associate justice of the Supreme Court in 1903 by President Roosevelt.

**Day Lil'y**, the popular name for a genus of lilies, natives of temperate Asia and eastern Europe, two species of which are grown in gardens. They have long leaves, growing from the ground, and a branched, few-flowered stem, with large, fragrant, white blossoms, the segments of which are united into a tube.

**Day'ton**, OHIO, the county-seat of Montgomery co., on the Great Miami River, 60 mi. n. e. of Cincinnati, on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie, the Pennsylvania and other railroads. The city has a beautiful location in the fertile Miami valley. From the main business portion, the land rises to heights of from 100 to 400 feet, and on these elevations are some of the fine residence sections. Van Cleave Park, along the river, where the first settlers landed, contains the first house built in Dayton, which now serves as an historical museum. There is a fine soldiers' monument on Main Street near the river bridge. Spanning the rivers are twelve bridges, three of which are beautiful, wide, arched structures of concrete. On an elevation adjoining the city at the west is the central branch of the National Soldiers' Home, which occupies beautiful grounds of about 600 acres. The public library stands in Library Park, near the center of the city.

The educational institutions of Dayton include the United Brethren Theological Seminary, Saint Mary's Institute, the Academy of Notre Dame, good public schools, including kindergartens, manual training school and the Steele High School. The Miami Valley and Saint Elizabeth's hospitals, a state asylum for the insane, a county orphan asylum and a widows' home are other institutions. There are many fine churches, and some of the prominent buildings are the old and new courthouses, the Y. M. C. A. building, the Union Passenger station, the United Brethren, Conover, Arcade and other business blocks and several hotels.

## Dayton

There are many large industrial establishments producing cash registers, railway cars, oil-mill machinery, steam pumps, sewing machines, bicycles, automobiles, engines, flour, sash and blinds and various other articles. In 1796, the first settlement was made on land which was purchased the previous year from the indians by Colonel Ludlow and Generals Saint Clair Wilkinson and Jonathan Dayton, after whom the place was named. It was incorporated in 1805, and was chartered as a city in 1841. In March, 1913, the city suffered disastrously from a great overflow of the Miami. Several hundred lives were lost and millions of dollars worth of property were destroyed. For several days Dayton was entirely cut off from the rest of the world because tracks were washed out and wires were down. Many other towns of the Ohio Valley also suffered. In the same year Dayton adopted the commission form of government, which was followed in January, 1914, by the appointment of a city manager. See MUNICIPAL GOVERNMENT.

**Dayton**, WILLIAM LEWIS (1807-1864), an American statesman, born in Somerset co., N. J. He graduated at Princeton in 1825, studied law and began practice in Trenton, N. J., in 1830. He was appointed to the United States Senate in 1842 to fill a vacancy, and was reelected in 1845, being an active opponent of slavery. In 1856 he was nominated for vice-president on the Republican ticket with John C. Fremont. From 1861 until his death he was minister to France.

**Deaconess**, *de'kon ess*, a religious order among women in various branches of the Christian church. The first references to the order are found in *Romans* xvi, 1 and *I Timothy* v, 9 and following verses. The order seems to have been established during the days of the Apostles, and the functions of the members were to assist the deacons and other officials of the church, especially in the care of women. In the fifth century the order was abolished and was not revived until the early part of the nineteenth century. The first of the modern orders was established in Prussia in 1836, by the United Evangelical Church. The first order in the United States was established in Saint Andrew's Parish of the Protestant Episcopal Church, Baltimore, in 1855, and in 1888 the general conference of the Methodist Episcopal Church provided for the establishment of an order of deaconesses. The members of the modern orders are required to prepare themselves by

## Dead Sea

special training in school devoted to this purpose and are usually inducted into office by the authorities of the church. Various branches of the Christian church now maintain these orders throughout the United States and most of the countries of Europe. Their work is similar to that of the early deaconesses, though somewhat more extended, as the requirements of the church are broader. In the Catholic and some of the Episcopal churches, the work of deaconesses in other churches is performed by sisterhoods.

**Dead-letter Office**, a division of the post office department to which is sent all mail matter that cannot be delivered. This matter includes all letters and packages that have remained in the office to which they were sent for one month without being called for, and which do not contain any address for their return to the sender; letters, papers and packages that are imperfectly addressed, and articles excluded from the mails by the regulations of the postal authorities, such as liquids, live animals and explosives. Each year thousands of packages, opened and unopened, are disposed of at public auction. See POSTOFFICE.

**Dead Reck'oning**, the calculation of a ship's place at sea, without any observation of the heavenly bodies. It is obtained by keeping an account of the distance the ship has run by the log and of her course steered by the compass, and by rectifying these data by the usual allowance for drift, leeway and winds. Dead reckoning can never be accurate; so whenever possible it is corrected by astronomical observations.

**Dead Sea**, called in Scripture Salt Sea, Sea of the Plains and East Sea, a celebrated lake in Asiatic Turkey, near the south extremity of Palestine. Its length is about 46 miles, and its breadth at the widest part, 9 or 10 miles. The basin in which the Dead Sea reposes forms the south end of the great depression through which the Jordan flows, that river entering the lake at its north extremity. It receives several other tributaries, but has no outlet. The surface is 1312 feet below the level of the Mediterranean. It lies deeply imbedded between lofty cliffs of naked limestone, its shores presenting a scene of indescribable desolation and solitude, encompassed by desert sands and bleak, stony, salt hills. Sulphur and rock salt, lava and pumice abound along its shores. The water is nauseous to the taste and smell, and it is so buoyant that the human body will not sink in it. The Dead Sea contains no life of any kind. At about a



third of its length from the north end it attains a maximum depth of 1308 feet.

**Dead' wood**, S. D., the county-seat of Lawrence co., is situated in the canyon of White-wood Creek, on the Chicago, Burlington & Quincy and the Chicago & Northwestern railroads and on an electric line to Lead, three miles southwest. The city is in the center of a rich gold belt, and cyanide works, smelters and other mining industries are located here. It is also the seat of a United States assay office. Among the important buildings are the Masonic Temple and Franklin Hotel. The place was settled in 1876. Population in 1910, 3653.

**Deaf, def, and Dumb** (or **Deaf-mutes**), persons both deaf and dumb, the dumbness resulting from deafness, which has either existed from birth or from a very early period of life. Such persons are unable to speak, simply because they have not the guidance of the sense of hearing to enable them to imitate sounds. Among the causes assigned for congenital deafness are the intermarriage of near relatives, hereditary transmission, scrofula, certain local or climatic conditions and arrest of development before birth. Acquired or accidental deafness, which occurs at all ages, is frequently due to such diseases as smallpox, measles, typhus, paralysis and other affections of the brain, but more particularly to scarlet fever, which is somewhat apt to leave the patient deaf, owing to the inflamed state of the throat extending to the internal ear, and thus causing the formation of pus and the destruction of the extremely delicate parts of the auditory apparatus. In the greater proportion of deaf-mutes no defect is visible, none can be detected by anatomical examination and no applications yet discovered appear to be useful. The necessity of communication and the want of words oblige the deaf-mute to observe and imitate the actions and expressions which accompany various states of mind and of feeling, to indicate objects by their appearance and use, and persons by some peculiar mark, and to describe their actions by direct imitation. In this way he and his friends are led to form a dialect of that universal language of attitude, gesture and expression which becomes a substitute for words in the hands of the pantomimic actor, and which adds force and clearness to the finest effusions of the orator; in other words, the natural sign language, which, in its elements, is to be found among all nations. Such a means of communication is at its best very imperfect, however,

and various more perfect systems have been devised to enable deaf-mutes to communicate with one another and with the rest of mankind, and thus to gain such an education as people in general possess. See **DEAF AND DUMB, EDUCATION OF**.

**Deaf and Dumb, EDUCATION OF.** In ancient times and during most of the Middle Ages, the deaf were considered incapable of caring for themselves and could not enter upon a contract. In 1648 John Bulwer published a work in English advocating the education of deaf-mutes. About one hundred years later the first public demonstration of the practicability of such education was made. At about the same time a successful system of instruction was introduced into the Royal Parisian Institute, where it was followed for a long time. The vocal system of instruction was introduced into Germany in 1779, and the first public institute in England was established in 1792.



DEAF AND DUMB ALPHABET  
For one hand

From this originated the London Asylum on Kent Road. The first school for the instruction of deaf in the United States was established at Hartford, Conn., in 1817. For a time this school received inmates from the New England states and from South Carolina and Georgia. Massachusetts then established an institute, and other states followed, until now every state has an institution for the education of deaf-

mutes, and California, Illinois, Indiana, Massachusetts, Michigan, Missouri, Ohio and Wisconsin have provisions for establishing classes in connection with the public schools.

There are two methods of instruction which are generally followed. These are known as the *sign* method and the *oral* method. According to the first, the pupils are taught by the manual alphabet and by signs. According to the oral method the pupils are taught to observe the lips and other vocal organs of the teacher and then to reproduce the sounds. In the teaching of deaf children to speak, the pupils not only are expected to observe the motions of the organs, but are required to place their hands upon the throat of the teacher and feel the vibrations, then to place their hands upon their own throats and reproduce these vibrations. Most deaf children are expert observers with the eye and hand, and because of this they can be taught to speak intelligently, though the tones of the voice are usually more or less unnatural. However, often the work is so successfully done that persons carry on conversation with them without discovering their infirmity. In con-



DEAF AND DUMB ALPHABET  
For two hands

nection with both systems the pupils are taught to read and write ordinary print and script. In all state institutions industrial training is also carried on along with the literary education.

Opinion is divided on the advantages to be derived from each of these methods of instruction. Those who favor the sign method claim that it is much more easily learned, and that the pupils therefore can make more rapid

progress; while the opponents of this system claim that the use of the sign language is not calculated to develop the intellect, and that pupils trained by this method never receive as broad an education or become as efficient thinkers as those trained by the oral method. Undoubtedly the great disadvantage of the oral method is the length of time required in mastering it, but when it is once mastered it is much more useful to the individual than the sign method. In 1848 Professor A. Melville Bell introduced what is known as the system of visible speech for instructing the deaf, and this system has now been quite generally adopted in the schools of this country and England. See VISIBLE SPEECH; SIGN LANGUAGE.

**Dear'born**, HENRY (1751-1829), an American soldier who distinguished himself in many battles of the Revolution and in the War of 1812. He was captured by the British at Quebec, but was released the next year and was with Washington at Yorktown. In 1793 he was elected to Congress and served two terms, and for eight years he was secretary of war. His last important public service was as minister to Portugal.

**Death's-head Moth**, a large moth, which has upon the back of its thorax marks closely resembling a skull, or death's-head. Its wings measure four or five inches across. Although the subject of many superstitious beliefs, it is probable that it does no other damage than occasionally attacking bees and consuming their honey.

**Deathwatch**, a beetle that lives in the woodwork of houses. Its call is a peculiar ticking sound, which superstitious people have interpreted as a forerunner of death.

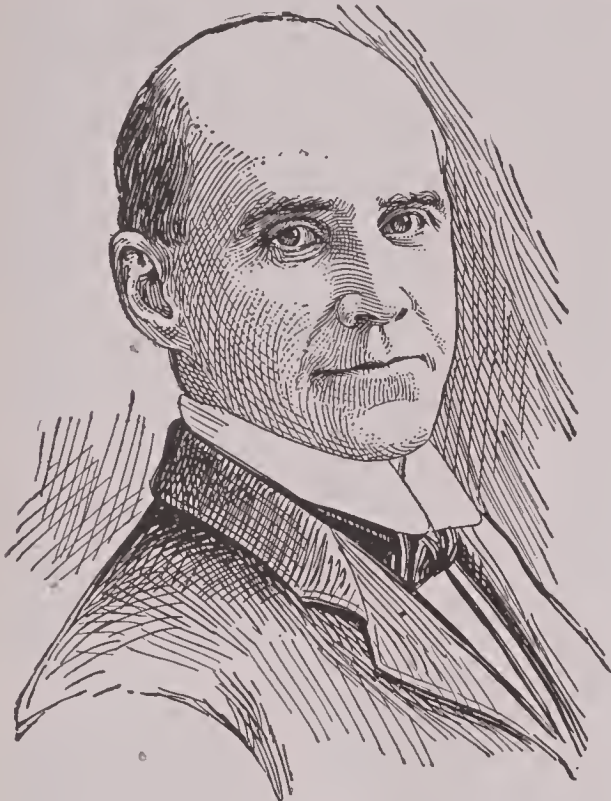
**Debreczen**, *deb'bret sen*, a town of Hungary, on the edge of the great central plain, 137 mi. e. of Budapest. Among the principal edifices are the Protestant Church, the Rathaus, a theater and a college. The chief manufactures are coarse woollens, sausages, soap, tobacco pipes and casks, and a large trade in cattle is carried on. Population in 1910, 92,729.

**Debs**, EUGENE VICTOR (1855- ), an American labor leader and lecturer, born at Terre Haute, Ind. He received a common school education, became locomotive fireman on the Terre Haute & Indianapolis railroad, and finally was a clerk in a wholesale grocery house. In 1879 he was elected city clerk of Terre Haute and six years later became a member of the Indiana legislature. From 1880 to 1893 he



## Debt

was grand secretary and treasurer of the Brotherhood of Locomotive Firemen, and in the latter year he was made president of the newly organized American Railway Union. In that capacity he had charge of the immense western railway strike that centered at Chicago in 1894. During



EUGENE V. DEBS

its progress he was charged with conspiracy, but was acquitted; however, he was imprisoned for six months for contempt of court in violating an injunction. He was the candidate of the Socialist party for president of the United States in 1900, 1904, 1908 and again in 1912.

**Debt**, *det*, in the most general sense, that which is due from one person to another, but more strictly, in law, a sum of money due by reason of a particular and explicit agreement. The law regarding the debtor has had an interesting development. In most ancient times, and even in England under Saxon rule, the debtor became the practical, if not the actual, slave of his creditor. Under the feudal system, since military service played such an important part, the confinement of the debtor was impracticable, and there was a gradual change toward leniency in his treatment; but with the passing of feudalism the reactionary tendency toward severity set in, which only within a century has been ended by the abolishing of imprisonment for debt. An action to recover a debt is now begun by civil suit, which may result in a judgment payable in money, or, in lieu of

## Decapolis

voluntary payment, by forcible seizure of enough of the debtor's property to pay the debt and the costs of the suit. Courts, however, still possess the right to punish severely and even to imprison debtors, where fraud or concealment or deception is evident. See **BANKRUPTCY**; **GARNISHMENT**; **EMBEZZLEMENT**; **CONTRACT**.

**Debt**, **NATIONAL**. See **NATIONAL DEBT**.

**Decalogue**, *dek'a log*, (*deka*, ten, and *logos*, a word), the ten commandments, which, according to *Exodus* xx and *Deuteronomy* v, were given by God to Moses on two tables. The Jews called them the *ten words*. Jews and Christians have divided the ten commandments differently; and in some Catholic catechisms the second commandment has been united with the first, and the tenth has been divided into two.

**Decamps**, *de kahN'*, ALEXANDRE-GABRIEL (1803-1860), a French painter, born in Paris. He received very little instruction, but worked industriously until he gained success. He chose for his subjects studies in landscape and common life. He was especially strong in the handling of color and in producing brilliant effects of atmosphere and light. As a landscape painter he was influenced by the English Constable and was highly reputed because of his interpretation of nature. Among his works are *The Monkey Experts*, *Cafe in Asia*, *Street of a Roman Village* and *Children Playing near a Fountain*.

**De Candolle**, *de kahN dohl'*, AUGUSTIN PYRAME (1778-1841), one of the most celebrated of botanists, born in Geneva, Switzerland. His youth was spent in industrious study of plant life, and at the age of eighteen he was writing books which gained him recognition among prominent scientists. Four years later he was made a professor in the College of France, and a few years afterwards he removed to Geneva, where a chair of natural history was founded for him and where he continued his scientific work for many years. His greatest published work was an important treatise on the vegetable kingdom, of which only seven volumes were completed before his death, the remaining fourteen being finished by his son.

**Decap'olis**, the name applied to a league of a number of cities of Palestine, which, like the Hanse towns, had certain privileges which are not clearly understood. Although the name literally means *ten cities*, the number in the league varied at different times. At the rising

of the Maccabees these cities were subdued by them, but when in 63 B. C. Pompey conquered the East, he annexed them to Syria. As they were surrounded by Jews, they needed some protection, and it is probable that the league was formed at this time.

**Deca'tur**, ILL., the county-seat of Macon co., 38 mi. e. of Springfield, on the Sangamon River and on the Illinois Central, the Wabash, the Vandalia and other railroads. The city is in a fertile, agricultural section, has good railroad facilities and ships large quantities of grain, live stock and coal. There are large grain elevators, flour mills, railroad shops and manufactures of iron, agricultural implements, furniture, carriages and other articles. The place was settled in 1830 and was incorporated six years later. Population in 1910, 31,140.

**Decatur**, STEPHEN (1779-1820), an American naval officer, born in Sinnepuxent, Md. In 1798



STEPHEN DECATUR

he entered the navy, and in 1803 he was given command of the *Enterprise*. The recapture and destruction of the United States frigate *Philadelphia*, which had been taken by the Tripolitans, was a daring act which won him promotion to the rank of captain. In 1812, while commander of the frigate *United States*, he encountered the British frigate *Macedonian* and captured her. On his way to sea through Long Island Sound, in 1813, Decatur's vessel was blockaded by the British fleet, and he was driven into New London where he was kept

for a year by a blockade. In 1815 he was sent with a squadron of nine vessels to the Mediterranean, captured two Algerine vessels and compelled the dey of Algiers to negotiate a treaty. He then entered Tunis and Tripoli, forced the release of the American prisoners and obtained satisfaction for past offenses. Returning to the United States, he was made a naval commissioner. His death was caused by a wound received in a duel with Commodore Barron.

**Dec'can**, a term locally limited to the territory of Hindustan, lying between the Nerbudda and the Kistna, but generally understood to include the whole country south of the Vindhya Mountains, thus comprising the presidency of Madras and part of Bombay, Hyderabad, Mysore, Travancore and other native states.

**December**, *de sem'bur*, the twelfth month of our year, from the Latin *decem*, ten, because in the Roman year, instituted by Romulus, it constituted the tenth month, the year beginning with March. In December the sun enters the tropic of Capricorn and passes the winter solstice.

**Decemvirs**, *de sem'virz*, (Latin, *decem*, ten, and *vir*, man), a board of ten men; specifically, the body of ten magistrates who had absolute authority in ancient Rome, 451-449 B. C. Those who officiated during the first of these years drew up an excellent code of laws and ruled wisely, but those who followed them were tyrannical and were driven from power by a revolution.

**Deck**, any one of the floors of a ship. The decks are named according to the position in the ship and also according to their uses. *Quarterdeck* means that part of the main deck which is back of the mainmast and on which the officers are usually to be found. In former times this was a short deck that communicated with the fore part of the ship only by a narrow passageway along the side of the ship; hence it was named the quarterdeck. The *forecastle deck* lies in the ship's bow, near the quarters of the men. The *main deck* in the United States navy is the highest deck, which extends the full length of the ship, and above it is the *upper deck*. The officers who navigate the ship occupy a raised platform, from which they can see the whole ship. This is known as the *bridge deck* or the *bridge*. In ships differently constructed and used for different purposes, there are numerous decks that receive special names.



## Declaration of Independence

**Dec'lara'tion of In'depen'dence**, the solemn declaration of the Continental Congress in America, in session at Philadelphia, by which the thirteen colonies formally renounced allegiance to the government of Great Britain. It was the outgrowth of a gradual change of sentiment among the colonists, away from the old affection for England and its traditions toward a pride in local achievements and the love of the principles of self-government. The formal declaration was preceded by resolutions in the assemblies of almost all of the colonies, declaring that independence was inevitable and necessary. Finally, on May 15, 1776, John Adams offered a resolution recommending that each state form its own independent government, and on June 17 another formal resolution was introduced by Richard Henry Lee, declaring "that these united colonies are, and of right ought to be, free and independent states." After a long and somewhat bitter debate, in which the representatives of New York and Pennsylvania opposed the resolution, causing a delay of some weeks, it was passed on July 1, New York alone still withholding its approval. A committee was appointed on the following day, consisting of Thomas Jefferson of Virginia, John Adams of Massachusetts, Benjamin Franklin of Pennsylvania, Roger Sherman of Connecticut and Robert R. Livingston of New York, to consider the form of the declaration. As it was presented, it was the work chiefly of Thomas Jefferson and was adopted with few changes, on July 4, by twelve colonies, New York adding her approval on July 9. The document was endorsed and signed on August 2, 1776. The news caused the wildest rejoicing in all parts of the country and did much to produce unity of sentiment throughout the colonies. The original document is now in the care of the state department, and is sealed in a steel case for preservation among the relics of history.

**Dec'lina'tion**, in astronomy, the distance of a heavenly body from the celestial equator, measured on a great circle passing through the pole and also through the body. It is said to be north or south according as the body is north or south of the equator. Great circles passing through the poles and cutting the equator at right angles are called *circles of declination*. Twenty-four circles of declination, dividing the equator into twenty-four arcs of  $15^\circ$  each, are called *hour circles* or *horary circles*. Declination, then, corresponds to latitude on the earth and is one of the two elements in determining the

## Decoration Day

location of heavenly bodies. In other words, if the right ascension and the declination of a star are known, astronomers can locate it at once (See ASCENSION, RIGHT). Declination of the magnetic needle in the compass, or *magnetic declination*, is the variation of the magnetic needle from the true meridian of a place. This may be either east or west and is different at different places and at the same place at different times.

**Decomposition**, *de kom'po zish'un*, is the breaking up of a compound into more simple parts. These parts may be either compounds or elements. In most cases decomposition separates one body into two or more bodies, but what is called double decomposition is a change or breaking up of two or more compounds into the same number of other compounds. Decomposition may be caused by such forces as heat, light, electricity and chemical reagents; or it may be due, as in the case of vegetable and animal matter, to very small animals or plants, called bacteria and ferments.

**Dec'ora'ted Style**, in architecture, that form of English Gothic architecture in use in Great Britain from the end of the thirteenth to the beginning of the fifteenth century, when it passed into the Perpendicular. It is distinguished from the Early English, from which it was developed, by the more flowing or wavy lines of its tracery, especially of its windows; by the more graceful combinations of its foliage; by the greater richness of the decorations of the capitals of its columns, and generally by a style of ornamentation more profuse and naturalistic, though somewhat florid. The most distinctive ornament of the style is the ball flower, which is usually inserted in a hollow molding. The decorated style has been divided into two periods, the *Early*, or *Geometrical Decorated*, period, in which geometrical figures are largely introduced in the ornamentation; and the *Decorated style* proper, in which the peculiar characteristics of the style are exhibited. To this latter period belong some of the finest monuments of British architecture.

**Dec'ora'tion Day** or **Memorial Day**, the day set apart in the United States for the decoration of the graves of soldiers who fought in the Civil War. The custom originated before the close of the war in the South, where, in the spring of each year, women went together to the graves of the soldiers and decorated them with wild flowers. At about the same time a similar custom arose in the North, and on May 5,

## Decoy

1868, General John A. Logan, then commander in chief of the Grand Army of the Republic, fixed May 30 of that year as the day upon which the graves of the dead soldiers should be strewn with flowers. Since that time, though there has been no Federal legislation, most of the states have appointed May 30 of each year as a legal holiday for this purpose. It is generally known in the South as Memorial Day.

**Decoy'**, a place into which wild fowls are decoyed in order to be caught. A decoy pond is kept only in a secluded situation. Several channels or pipes of a curved form, covered with light, hooped network, lead from the pond in various directions. The wild fowl are enticed to enter the wide mouth of the channel by tamed ducks, also called decoys, trained for the purpose, or by grain scattered on the water. When they have got well into the covered channel they are surprised by the decoyman and his dog and are driven up into the funnel net, where they are easily caught. The details differ in different cases, but this is the general principle of the contrivance. In the United States *decoy* is the name of an artificial bird, made to attract living birds of the same kind within the range of a hunter. Decoy ducks are most in use. These are made of wood or other material and are placed on the water, where they float 'about in a lifelike manner near the concealed sportsman. Ducks flying over see the decoys and join them. In some states this manner of hunting is prohibited by law.

**Dedham**, *ded'am*, MASS., the county-seat of Norfolk co., 10 mi. s. w. of the state house in Boston, on the Charles River and on the New York, New Haven & Hartford railroad. The town is a residence suburb of Boston and contains manufactures of cotton and woolen goods, carpets and pottery. The place was settled in 1635 and was called Contentment, but was incorporated the next year under its present name. The first public school in America supported by a general tax was established here in 1644. Population in 1910, including several villages, 9284.

**Deduction.** See DEDUCTIVE METHOD.

**Deductive Method**, in pedagogics, the method of teaching which begins with general truths or *a priori* principles (See A PRIORI AND A POSTERIORI), such as definitions and rules, and proceeds to apply them to particular facts. It is also called the synthetic method, because

## Deed

it creates individual ideas under general laws. It is the reverse of the inductive method and is adapted to much of the work in grammar grades and predominates in teaching in high schools, colleges and universities. Geometry affords an excellent illustration of a branch which is taught by the deductive method. The theorems are the general truths with which the pupil starts, and he proceeds to prove these by the demonstration of particular propositions. The teaching of cube root by having pupils learn the rule and then apply it to the solution of problems is another good illustration, while the teaching of cube root by having pupils discover the rule by cubing a binomial, as  $x + y$ , and then applying, is an illustration of combining the inductive and deductive methods. See INDUCTIVE METHOD; METHODS OF TEACHING.

**Dee**, a river in England and Wales, rising in Lake Bala, Merionethshire. It flows north and northwest to the Irish Sea, 20 miles below Chester. It is about 80 miles long, and its tributaries are the Treveryn and the Alwyn. The Dee has connection with the rivers of central England by canals.

**Dee**, the name of two rivers in Scotland. The larger rises in the neighborhood of Ben Macdhui, and after a course of 12 miles it is joined by the Geauley, runs through Aberdeenshire and a part of Kincardineshire and empties into the North Sea. It is 90 miles long. The smaller Dee rises near the northern boundary of Kirkcudbrightshire. It flows in a southeasterly direction during the first part of its course, and then westerly, falling into the Solway Firth. It is 50 miles long and is noted for its excellent fisheries.

**Deed**, in law, a writing containing some contract or agreement, and the evidence of its execution; particularly, an instrument on paper or parchment, conveying real estate to a purchaser or donee. In the latter sense deeds are of two kinds, *warranty* and *quitclaim*. The former is one in which the party granting title to the property agrees to defend it against all claimants. The latter transfers whatever title the grantor has to the grantee. A deed should contain reference to some *consideration*, or compensation, and its granting clause should convey "to the party of the second part, *his heirs and assigns*." It should be signed by the grantor and his wife, if he is a married man, or by his authorized agent, and should be witnessed by at least two persons, then given to the grantee.



## Deer

who will have it recorded by the proper officer, the county register of deeds.

**Deer**, a general name for certain hoofed animals constituting a family in which there are more than fifty species. The distinguishing characteristic of the genus is that the members have solid, branching horns, which they shed every year. These antlers are outgrowths from the bone and are first covered by flesh and a velvety skin, which, when the horns are fully developed, dries up and is rubbed away, leaving the bones bare. The forms of the horns are various; sometimes they spread into broad palms, which send out sharp snags around their outer edges; sometimes they divide fantastically into branches, some of which project over the forehead, while others are reared upward in the air; or they may be so inclined backward that the animal seems almost forced to carry its head in a stiff, erect posture. After the breeding season the antlers fall off, leaving only a little prominence on the head, from which the new antlers develop with great rapidity. The male deer is called a *buck*, the female, a *doe*, and the young, a *fawn*.

There are many species of deer, as the *red deer* or *stag*, the *fallow deer*, the *roe*buck, the *reindeer*, the *moose*, the *elk*, the *axis* and the *wapiti*. Deer are fairly widely distributed over the world, though there are none in Australia and few in Africa, where the antelopes take their place. Hunting the deer is great sport in the United States and Europe, and the flesh, or *venison*, as it is called, is much desired for the table. The skin is valuable for making a leather, called *buckskin*, and the antlers and hoofs are used in the manufacture of various kinds of ornamental goods. See CARIBOU; ELK; MOOSE; REINDEER; WAPITI; Color Plate with article GAME.

**Defiance**, OHIO, the county-seat of Defiance co., 51 mi., s. w. of Toledo, on the Maumee River, at the mouth of the Auglaize, on the Miami and Erie Canal and on the Wabash and the Baltimore & Ohio railroads. Defiance College is located here, and the city has a public library. It has a number of manufactories and conducts a large trade in agricultural produce and live stock. Population in 1910, 7327.

**Defoe**, DANIEL (1661-1731), one of the first English novelists, born in London. He was educated for the ministry, but began early to give his attention to literature. His first publications were political satires, notable among them *The True-born Englishman*, a

## Deglutition

pamphlet in favor of William III, and *The Shortest Way with Dissenters*. *The Apparition of Mrs. Veal*, published in 1706, showed much of the genius for making fiction seem like fact which so strongly marks Defoe's later work. In 1719 appeared *Robinson Crusoe*, reckoned usually as the first English novel, in the modern sense of the term. This was followed by *The Memoirs of a Cavalier*, *Captain Singleton*, *Moll*



DANIEL DEFOE

*Flanders*, *Journal of the Plague Year* and *Roxana*, which, while they never attained the popularity of his first work, nevertheless possessed many of the qualities which made that remarkable. Defoe's genius consists largely in his ability to put himself in the place of his characters and to give without wearisomeness just the details which make a story seem real.

**Deglutition**, *deg'lu tish'un*, or the act of swallowing, is a muscular act, beginning in the mouth. The tongue is raised against the front part of the hard palate, the uvula takes a horizontal position to close the opening into the nostrils, the epiglottis is pressed down upon the glottis, or opening into the larynx, and when the food reaches the back of the throat it is seized by the involuntary muscles, carried quickly through the pharynx, slowly through the esophagus to the cardiac orifice, which opens to allow the food to enter the stomach.

## Degree

A juggler can drink while standing on his head, because swallowing is a muscular act.

**Degree'**, a term denoting extent or intensity. In geometry or trigonometry it is the ninetieth part of a right angle, or one of the three hundred sixty equal parts into which the circumference of every circle is supposed to be divided. A *degree of latitude* is the 360th part of the earth's circumference north or south of the equator, measured on a great circle at right angles to the equator, and a *degree of longitude* is the same part of the surface east or west of any given meridian, measured on a circle parallel to the equator. Degrees are marked by a small ° near the top of the last figure of the number which expresses them; thus, 45° is 45 degrees. The degree is subdivided into sixty equal parts, called minutes; and the minute is again subdivided into sixty equal parts, called seconds; thus, 45° 12' 20" means 45 degrees, 12 minutes and 20 seconds. The magnitude, or quantity, of angles is estimated in degrees and parts of a degree. An angle is said to be of so many degrees as are contained in the arc of a circle intercepted between the lines which contain the angle, the vertex of the angle being the center of the circle; thus, we speak of "an angle of 90° or of 45° 24'." The length of a degree of circular measure depends upon the radius of the circle of the circumference of which it is a part, the length being greater, the greater the length of the radius. Hence the length of a degree of longitude is greatest at the equator and diminishes continually toward the poles, at which it equals 0. Under the equator a degree of longitude contains 60 geographical or 69.16 statute miles (See MILE). The degrees of latitude are found to increase in length from the equator to the poles, owing to the shape of the earth. At the equator, 1° of latitude equals about 68.7 miles; at 45°, 1° equals about 69.05 miles.

The term is also applied to the divisions, spaces or intervals marked on a mathematical, meteorological or other instrument, as a thermometer or barometer.

The name *degree* is also given to the title bestowed upon one who has successfully completed a prescribed course of study or training.

**De Groot, de grote'**; HUGO. See GROTIUS, HUGO.

**De'ism**, a system of philosophy which recognizes a great first cause, or a Supreme Being, distinct from nature or the universe. Deism is opposed to atheism and pantheism; it implies

## Delagoa Bay

a disbelief in revelation, is skeptical as regards the value of miraculous evidence and assumes that the light of nature and reason are the only guides in doctrine and practice. In the last century there were a series of writers who are spoken of distinctively as the English deists. They include Collins, Toland and Tindal. See ATHEISM; PANTHEISM.

**De Kalb'**, ILL., a city in De Kalb co., 58 mi. w. of Chicago, on the Chicago & Northwestern and the Chicago Great Western railroads. The Northern Illinois State Normal School is located here, and there are manufactures of wire, agricultural implements, wagons, shoes, gloves and other articles. The waterworks are owned and operated by the city. It was settled in 1838 and was incorporated in 1877. Population in 1910, 8102.

**De Kalb, JOHANN.** See KALB, JOHANN DE.

**De Ko'ven, REGINALD** (1859- ), an American composer, born at Middletown, Conn. He studied at Stuttgart and Paris and later attended Oxford University where he graduated in 1879. He devoted himself to composition and produced several popular operas and songs, among which are *Margery Daw*, *O Promise Me*, *Winter's Lullaby* and *Ask What Thou Wilt*. His leading operas are *Robin Hood*, *Don Quixote*, *The Fencing Master*, *Rob Roy*, *The Mandarin* and *The Red Feather*. He is the founder and conductor of the Washington Symphony Orchestra.

**Delacroix, de lah krwah'**, FERDINAND VICTOR EUGENE (1799-1863), a French painter. He was the first to depart from the style of David and to found the Romantic School of 1830. His influence on French artists was very great, and with him and Géricault a change was brought about affecting every school of art in the world. This influence, perhaps more than his ability to paint, made him famous. His works are especially rich in colors. His first work, *Dante and Vergil in Charon's Bark*, is one of the best.

**Del'ago'a Bay**, in southeast Africa, a large sheet of water separated from the Indian Ocean by the peninsula and island of Inyack. The bay stretches north and south for about 70 miles, with a breadth of from 16 to 20 miles, and forms the southern extremity of the Portuguese settlement of Mozambique. It is available for vessels of large tonnage, though the presence of shoals, banks and flats hinders the navigation of the bay. The port and Portuguese settlement of Lourenço Marques has



## Deland

become a place of considerable trade since the opening of gold mines in the Transvaal.

**Deland'**, MARGARETTA WADE CAMPBELL. (1857- ), an American author, born in Allegheny, Pa. She was educated in private schools and taught drawing in New York until 1880, when she married and removed to Boston. Her first novel, *John Ward, Preacher* (1888), was widely popular. Among her other books are *Old Chester Tales*, *Dr. Lavendar's People*, *The Awakening of Helena Richie* and its sequel, *The Iron Woman*, and a volume of poems.

**De la Ramee**, *de lah rah may'*, LOUISA. See RAMEE, DE LA, LOUISA.

**Delaroche**, *de la rohsh'*, PAUL (1797-1856), probably the greatest painter of the French school. He studied landscape painting for a short time, but applied himself afterward to historical painting and rapidly rose to eminence. His subjects are principally taken from French and English history. There is little real feeling or sentiment in his works, but the pictorial effect is present to a high degree. Among his well-known pictures are *Death of Queen Elizabeth*, *Princes in the Tower*, *Joan of Arc* and *Napoleon at Fontainebleau*.

**Del'aware**, THE DIAMOND STATE, a Middle Atlantic state, one of the original thirteen, bounded on the n. by Pennsylvania, on the e. by the Delaware river and bay and the Atlantic Ocean, on the s. and w. by Maryland. Its length is 96 miles, its width is from 9 to 36 miles, its total area is 2370 sq. mi., of which 405 sq. mi. are water. Except Rhode Island it is the smallest state in the Union. Population in 1910, 202,322.

**SURFACE.** Except a small hilly section in the north, the surface is uniformly low and level and is generally sandy. In the extreme south there is much swamp land. The highest elevation is only 282 feet above the sea. The coast of Delaware Bay is marshy, and some of the land is enclosed by dykes and thus rendered tillable. The Atlantic coast has many sand beaches enclosing shallow lagoons. Near the western boundary, a low wooded ridge extends southward from the Christiana and Brandywine rivers. Cypress Swamp, on the southern border, is 12 miles long and 6 miles wide. The height of land between Chesapeake and Delaware bays divides the state into two drainage areas. To the west of this divide the rivers flow into Delaware River or the bay. To the east they flow into the Atlantic. The rivers of Delaware, though numerous, are all small and are unsuited to navigation.

**CLIMATE.** The climate is mild and healthful,

## Delaware

except in the south, where the swamps occasion fever. Autumn is particularly mild, and frosts seldom occur before about the middle of October. The mean temperature is about 55°. The average rainfall is about 49 inches.

**AGRICULTURE.** Delaware is an agricultural state. Improved farm lands occupy over 60 per cent of its entire area, a larger proportion than in any other state on the Atlantic coast. Only four states in the country (all North Central states) have a larger proportion than this. Delaware seems to be the natural home of the peach, while apples and small fruits and vegetables are raised in abundance for the New York and Philadelphia markets. Although fruit-growing is the chief industry, tomatoes, cereals, hops, tobacco, peas, beans, clover seed and flax are also important products. Fully 16,000 acres are planted to tomatoes each year. In the swampy districts are forests of cypress and evergreen trees.

**OTHER INDUSTRIES.** The principal manufacturing are steel and rolling mills, foundry and machine shops, ship-building yards, car-shops, tanning and canning and preserving works. The principal manufactures are at Wilmington. The great Edge Moor Bridge Works are near this city. At Dover fruit canning is the chief industry. Oyster and other fisheries are important and are growing each year.

**TRANSPORTATION.** Numerous railways bring the coal and iron fields of Pennsylvania within easy reach and render the markets at New York and Philadelphia accessible. The principal railroads in the state are the Baltimore & Ohio, the Philadelphia, Wilmington & Baltimore, the New York, Philadelphia & Norfolk. Good harbors at Wilmington, New Castle and Lewes, the canal connecting Chesapeake and Delaware bays and the navigability of the Delaware river and bay encourage coastwise and internal trade. A boat canal connects Chesapeake and Delaware bays, and the harbor at Lewes is protected by one of the largest breakwaters in the United States. There is some foreign commerce direct through Wilmington.

**GOVERNMENT.** The governor is elected for four years and may be re-elected, but is not eligible for a third term. The legislative department consists of a senate of 17 members and a house of representatives of 35 members. The members of the senate are elected for four years, and of the house for two years. The judiciary consists of six state judges, one of whom holds the office of chancellor and chief justice. The

## Delaware

judges are appointed by the governor and confirmed by the senate. The state has one representative in the lower house of Congress.

**EDUCATION.** The state provides for the purchase of free text-books in the public schools. There are good schools for both white and colored children. The State Agricultural College (for colored students) is at Dover. Newark is the seat of Delaware College; Wilmington, of Wesleyan Female College.

State institutions are an insane asylum, schools for the deaf, dumb and blind and an industrial school for boys and girls.

**CITIES.** The principal cities are Dover, the capital, Wilmington and New Castle.

**HISTORY.** Lord Delaware sailed into Delaware Bay in 1611, but no settlement was established until 1631, when the Dutch founded a trading post near the present site of Lewes, Del. Somewhat later the Swedes built a fort at the present site of Wilmington, and the English also contemplated entering the territory. Control alternated between the Dutch and the Swedes until 1655, when the Dutch from New Amsterdam under Stuyvesant drove out their competitors; but in 1664 Delaware, together with New York, passed into the hands of the English. After that time it became the bone of contention between rival English claimants, especially the colonies of Maryland, New Jersey and Pennsylvania, the latter finally gaining control in 1682. In 1691 it was granted a separate assembly; two years later it was reunited to Pennsylvania, but in 1711 was recognized as a separate colony. During the Revolution, Delaware was loyal to the patriot cause, formed an independent state government in 1776 and was the first to ratify the Federal Constitution (December, 1787). Under the republic she rapidly gained in wealth and population. Though a slave-holding state, she remained faithful to the Union at the opening of the Civil War, but furnished many recruits to the Confederate army. At the close of the struggle, her legislature firmly resisted the passage of the amendments, and nowhere did race hatred reach a higher point. In recent years warring political factions of the Republican party have fought for control of the state, and as a result Delaware was long deprived of one United States senator and from 1901 to 1904 of both senators.

**Delaware**, a river of the United States, which rises in the Catskill Mountains in New York, separates Pennsylvania from New York and New Jersey, and New Jersey from Delaware, and

## Delaware Water Gap

loses itself in Delaware Bay. It has a course of about 410 miles and is navigable for large vessels to Philadelphia and for smaller craft to the head of tide water at Trenton. Its chief tributaries are the Schuylkill and the Lehigh.

**Delaware**, OHIO, the county-seat of Delaware co., 24 mi. n. of Columbus, on the Whetstone (Olcutt) River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Hocking Valley and the Pennsylvania railroads. The Ohio Wesleyan University is located here. The city has a public library and contains railroad shops, foundries, flour mills and other manufactories. There are mineral springs in the vicinity. The city was incorporated in 1827. Population in 1910, 9076.

**Delaware**, an indian tribe belonging to the Algonquian family, originally known as living on the Delaware River, and called by themselves *Lenni-Lenape*. They had to leave their original settlements about the middle of the eighteenth century and go farther west. Later they were removed to the Indian Territory. Their numbers are now insignificant.

**Delaware** or **De la Warr**, THOMAS WEST, Lord (1577-1618), a British colonial governor in Virginia and the discoverer of Delaware Bay. At the age of twenty-five he was admitted to Queen Elizabeth's privy council, and in 1609 he was a member of the Council of Virginia in England. In the following year he was sent to Virginia as governor and captain general under the charter of 1609, arriving just as the colonists were embarking for England. He lived with the greatest pomp and splendor, but displayed ability and energy as an executive and helped firmly to establish a colony on a prosperous basis. In 1611 he left Virginia for the West Indies in search of health, but was driven by storm into Delaware River. He later returned to England and died while on a voyage to America.

**Delaware Bay**, a bay on the Atlantic Ocean between the states of Delaware and New Jersey. It is about 40 miles long, and its greatest width is 25 miles. At the entrance, near Cape Henlopen, is situated the Delaware Breakwater, which affords vessels a shelter within the cape. This breakwater was erected by the Federal government and cost about \$3,000,000. See **BREAKWATER**.

**Delaware Water Gap**, a narrow gorge in the Kittatinny Mountains, on the borders of Pennsylvania and New Jersey, through which the Delaware River flows. The mountains on



## Delcasse

each side rise to a height of 1400 feet above the water and form very beautiful scenery.

**Delcasse**, *del ka say'*, THEOPHILE (1852- ), a French statesman. His first prominent office under the government was that of minister of the colonies in 1894, and later he was foreign minister in several administrations. In 1899 he acted as mediator between the United States and Spain; he was conspicuous in the negotiations following the Boxer uprising in China in 1900, and he secured an important Anglo-French agreement in 1904. In 1911 he became minister of marine and in 1913 ambassador to Russia.

**Delft** (formerly Delf), a town in the Netherlands, 8 mi. n. w. of Rotterdam, on a canal between it and the Hague. Among its buildings are the townhall; the Prinsen-hof, the scene of the assassination of William the Silent, now a museum; the old Reformed church; the new church, containing monuments to William I and Hugo Grotius and the burial vaults of the present royal family. Formerly the town was especially famous for its manufacture of an earthenware known as Delftware (See POTTERY). Population in 1910, 34,388.

**Delhi**, *del'le*, or **Dehli**, *da'le*, a city of Hindustan, on the Jumna River in the Punjab, about 954 mi. n. w. of Calcutta. It was formerly the capital of the Mogul empire and the largest city of Hindustan, having once had a population of 2,000,000. In 1911, on the occasion of the visit of King George V to India, the capital was restored to Delhi, a move which added much to Britain's strength in the entire province. A vast tract, covered with the ruins of palaces, pavilions, baths, gardens and mausoleums, marks the extent of the ancient metropolis. The present city is surrounded on three sides by a stone wall 30 feet high. The palace or residence of the Great Mogul, built by Shah Jehan, commenced in 1631, and now known as the fort, is situated in the east of the city. It has great towers, surmounted by elegant pavilions, marble domes and gilded minarets. Since the Sepoy Mutiny of 1857 a great portion has been demolished, in order to make room for military barracks. Among modern buildings are the government college, founded in 1792, the Residency and a Protestant church. Population in 1911, 232,837.

**Delir'ium Tremens**, an affection of the brain, which arises from the inordinate and protracted use of ardent spirits. It is therefore almost peculiar to drunkards. The principal symptoms of this disease are delirium and trem-

## Delsarte

bling. The delirium is a constant symptom, but the tremor is not always present, or, if present, is not always perceptible. Frequently the sufferer is thrown into paroxysms of terror, by thinking he sees snakes or other animals, or the most frightful and grotesque objects.

**De Long'**, GEORGE WASHINGTON (1844-1881), an American Arctic explorer, born in New York City. He was educated in the public schools at Brooklyn. In 1865 he graduated from the United States Naval Academy. He commanded an exploring expedition to the Arctic regions which resulted in a number of important discoveries, but ended in disaster. De Long, with all of his party except two, died of starvation. See NORTH POLAR EXPLORATION.

**De'los**, an island of great renown among the ancient Greeks, fabled to be the birthplace of Apollo. It was a center of his worship and the site of a famous oracle. It is the central and smallest island of the Cyclades, in the Aegean Sea. Delos is now deserted, but it is covered with ruins.

**Delphi**, *del'fi*, an ancient Greek town in Phocis, originally called Pytho, the seat of the famous oracle of Apollo. The oracles were delivered by the mouth of a priestess, who was seated on a tripod above a subterranean opening, whence she received the vapors ascending from beneath and with them the inspiration of the Delphian god. The oracular replies were always obscure and ambiguous; yet they served, in earlier times, in the hands of the priests, to regulate and uphold the political, civil and religious relations of Greece. Delphi was also one of the meeting places of the Amphictyonic Council of the Greeks (See AMPHICTYONIC COUNCIL), and near it were held the Pythian games.

**Delphos**, *del'fos*, OHIO, a city of Allen and Van Wert cos., on the Miami & Erie Canal, 74 mi. s. w. of Toledo, and on the Toledo, Saint Louis & Western, the Pennsylvania and other railroads. Oil is found, and the water power is excellent. The city has railroad repair shops and manufactures of barrels and furniture. It was first settled in 1834. Population in 1910, 5038.

**Delsarte**, *del sahr't'*, FRANCOIS ALEXANDRE (1811-1871), a musician and investigator, born at Solesmes, France. He composed a few melodies and wrote several romances, but was chiefly known as a teacher of singing, declamation and physical culture. The latter he conducted according to an original method, in

which he combined physiological and psychological principles, for the attainment of grace and poise.

**Del'ta**, the name applied to plains formed at the mouths of rivers. The term originated with the Greeks, who first applied it to the plain formed by the mouth of the Nile, because of its triangular shape, resembling the Greek letter *delta*. Deltas are caused by the meeting of the river's current with an inflow from the sea, so that the outflowing current is slackened, and most of the silt which it holds in suspension is deposited. If the sea is quiet, this action soon builds up a plain which reaches to the surface. Vegetation takes root from this, and in time it becomes firm land. Deltas will not form where the sea is agitated by strong winds or where tides produce high waves, because these movements wash away the sediment; hence deltas never exist in broad estuaries like the Gulf of Saint Lawrence. The most noted deltas in the world are at the mouths of the Nile, the Mississippi, the Ganges, the Brahmaputra, the Hoang-ho, the Po and the Mackenzie. Some of these are very large, that of the Brahmaputra having an area of 50,000 square miles, and that of the Nile, about 20,000 square miles. The land of the deltas is usually very fertile, and if of sufficient elevation to drain, it is unusually valuable for agricultural purposes. See RIVER; EROSION.

**Deluge**, *del'uje*, a flood, supposed by many people to have destroyed nearly all the human and animal life on the globe. An account of, or a belief in, such a flood is to be found among the earliest inhabitants of America, but none exists among the Africans and none in Europe, except among the Greeks. The ancient literary works of Persia, Babylonia, Syria, Asia Minor, India and of the Hebrews show a belief in a flood. But geological investigations and discoveries show that if there was a deluge, the one most vividly described in the Bible (*Gen. vi-viii*) must have covered a comparatively small territory. The Babylonian story is much like that of the Hebrews, which it antedates, and it is claimed by some that both are derived from the same Semitic tradition; others that one is the copy of the other, the Babylonian account being a myth.

**Demand' and Supply'**. See VALUE.

**Demén'tia**. See INSANITY.

**Deme'ter**. See CERES.

**De Mille**, *deh mil'*, JAMES (1837-1880), a Canadian author. He studied at Brown Uni-

versity, and after teaching for some years in Acadia College he was made professor of history and rhetoric in Dalhousie College. Among his works are *Andy O'Hara*, *The Soldier and the Spy*, *The American Baron* and *The Living Link*.

**Democ'racy**. See GOVERNMENT.

**Dem'ocrat'ic Party**, the name given to the party in American history which was the successor of the Republican or Democratic-Republican or Anti-Federalist party, its fundamental doctrine being the application of the most democratic principles to the government. Specifically, it urged the strict construction of the Constitution and the strengthening of the state governments at the expense of the national government. It first came to power in 1801, with the election of Jefferson, and retained control of the national government continuously from that time until 1825, when John Quincy Adams, a former Democrat, but recently converted to the principle of loose construction and centralization, was elected over Andrew Jackson, the Democratic candidate. It returned to power in 1829, with the election of Jackson, was defeated in 1841 by William Henry Harrison, the Whig candidate, and again in 1848 by Taylor, a Whig, owing to a quarrel among New York State Democrats (See BARNBURNERS). Thereafter, it was continuously successful until the election of Lincoln in 1860. The issue of slavery and the Civil War caused a serious division in the party, and it did not again become united until ten years after the war, when, with Samuel J. Tilden as a candidate, the party gained a majority of the popular vote, though Tilden was defeated by the electoral commission (See ELECTORAL COMMISSION). In 1884 its candidate, Grover Cleveland, was chosen president, was defeated in 1888 and was again elected in 1892. For a detailed history of the party, its principles and its relations to other political parties, see POLITICAL PARTIES IN THE UNITED STATES; UNITED STATES, subhead *History*.

**Democ'ritus** (470-370 B. C.), a Greek philosopher of the new Eleatic school, a native of Abdera. He was called "the laughing philosopher," from his habit of laughing at the follies of mankind. He explained the origin of the world by the eternal motion of an infinite number of invisible and indivisible bodies or atoms, which differ from one another in form, position and arrangement, and which have a primary motion that brings them into contact and forms innumerable combinations the result



## Demosthenes

of which is seen in the productions and phenomena of nature.

**Demosthenes**, *de mos'the neez* (about 383-322 B. C.), a famous Greek orator. His father left him a considerable fortune, of which his guardians attempted to defraud him. Demosthenes at the age of seventeen years conducted a suit against them himself and gained his cause. He then set himself to study eloquence, and though his lungs were weak, his articulation defective and his gestures awkward, by perseverance he at length surpassed all other orators in power and grace. Against Philip of Macedon, who was attempting to place himself at the head of the Greek states, he directed his famous orations known as the *Philippics*, and he labored



DEMOSTHENES

to get all the Greeks to combine against the encroachments of Philip. He was present at the Battle of Chaeronea (380 B. C), in which the Athenians and Boeotians were defeated by Philip and Greek liberty was crushed. On the accession of Alexander in 336, Demosthenes tried to stir up a general rising against the Macedonians, but Alexander at once adopted measures of extreme severity, and Athens sued for mercy. It was with difficulty that Demosthenes escaped being delivered up to the conqueror. In 324 he was imprisoned on a false charge of having received a bribe from one of Alexander's generals, but managed to escape into exile. On the death of Alexander in the next year he was recalled, but the defeat of the Greeks by the Macedonians caused him to seek

## Denmark

refuge in the temple of Poseidon, in the island of Calauria, on the coast of Greece, where he poisoned himself to escape from the emissaries of Antipater. The character of Demosthenes is by most modern scholars considered one of the noblest in history.

**Demur'rer**, in law, a stop at some point in the pleadings, caused by a demand by one party to an action, for the court's judgment as to whether the facts, if admitted, are not insufficient to be a basis of action in law. It is now used to show legal reasons why the case should not proceed. See PROCEDURE.

**Dena'rius**, a Roman silver coin, originally worth 10, and later 16, of the pieces called *as*, the change being made when the weight of the *as* was reduced, on account of the scarcity of silver. The denarius was equivalent to about 14 cents of our money. There was also a gold denarius, equal in value to 25 silver ones.

**Den'ison**, TEXAS, a city in Grayson co., 72 mi. n. of Dallas, on the Saint Louis & San Francisco, the Missouri, Kansas & Texas, the Texas & Pacific and other railroads. It is an important railroad center in an agricultural country, producing grain, cotton, fruits and vegetables, and it contains cotton, cottonseed oil and flour mills and manufactures of mattresses, machinery, ice and other articles. The important buildings include the Saint Francis Xavier's Academy and the Washington School. It was settled in 1872. Population in 1900, 11,807, in 1910, 13,632.

**Den'mark**, a kingdom of Europe, made up of the peninsula of Jutland and several islands in the Baltic Sea. It lies between 54° 34' and 57° 44' 52'' north latitude, and between 8° 4' and 12° 45' east longitude. It is bounded on the n. by the Skagerrak; on the e. by the Cattegat, the Sound and the Baltic; on the s. by the Baltic and the district of Schleswig, and on the w. by the North Sea. It has an area of 15,388 square miles, almost twice that of the State of Massachusetts.

**SURFACE AND DRAINAGE.** The west coast of Jutland is low and sandy, while the east coast is level, contains several excellent harbors and is indented with fjords or firths, the most noteworthy being the Lymfjord, or Lumfjord, stretching across Jutland. The inland surface of Denmark is low, generally, though diversified with a range of hills across the middle part of Jutland, the highest points of which are 600 feet above sea. There are no lakes or rivers of note, the largest being the Guden,

## Denmark

which has a length of 100 miles. The largest islands are Seeland (Zealand) and Fünen.

**INDUSTRIES.** Denmark is the poorest of European countries in mineral resources. Peat is found in the west and north of Jutland, but no metallic ores of any kind appear.

The country is important as an agricultural district. Among the products grown are rye, barley, potatoes and beets. Stock raising and dairy husbandry are also very important industries. The forests are mostly made up of beech, though formerly the oak and ash were common.

Manufacturing is not an important industry. Porcelain is made extensively in Copenhagen, the capital, and other manufactures include locomotives, machinery, wool, linen and cotton. There are also many sugar refineries and a little iron smelting.

**TRANSPORTATION.** Most of the cities are situated on the coast or on navigable rivers. Steamboats run between the islands. The first railroad was opened for use in 1847, and after 1880 most of the railroads belonged to the State. The exports are mostly animal and dairy products, while the imports include cereals, coal, cotton, iron, manufactures and textiles. Germany, Great Britain, United States, Sweden, Norway and Russia are the leading countries connected with the trade.

**EDUCATION.** Denmark has a good system of education. The chief institution is the University of Copenhagen, founded in 1479. There are, besides, about twenty agricultural colleges, a college of pharmacy, the royal academy of arts and about one hundred commercial and technical schools.

**GOVERNMENT AND RELIGION.** The government of Denmark is a constitutional monarchy. The present constitution dates from 1849, and by it the executive power is vested in the king, and the legislative power lies in the king and a diet, or *Rigsdag*, consisting of the *Landsting*, or upper house, and the *Folkething*, or popular chamber. The former is composed of 66 members, 12 of whom are appointed by the king and the rest chosen for eight years by the people. The *Folkething* is composed of 114 deputies, elected by universal suffrage for a period of three years. All money bills must be submitted by the government first to this body. The established religion is Lutheran, but toleration is extended to all creeds.

**COLONIES.** The colonial possessions of Denmark consist of territories in Europe and

## Denmark

America, having an aggregate area of 86,634 square miles, and a total population of 120,890.

**CITIES.** The chief cities are Copenhagen, Aarhus, Aalborg, Odense and Horsens.

**LANGUAGE AND LITERATURE.** The Danish language belongs to the Scandinavian branch of the Teutonic family of languages and is closely allied to the Swedish and Norwegian. It is the most modern of the Scandinavian languages, soft and rather monotonous, with shades of sound difficult for a foreigner to acquire. It is written either in the German or the Roman characters. From the long union of Norway with Denmark, Danish became the written language of the Norwegians and is still to a large extent the language of the educated classes.

The oldest Danish book is a treatise on medicine, which dates from the first half of the thirteenth century. The first really literary writings were series of ballads, which were probably composed between the fourteenth and sixteenth centuries. During the Reformation period, Christian Pedersen (1480-1554) did for the Danish language what Luther did for the German, by publishing a translation of the New Testament and the Psalter, and later, the complete Bible. Modern Danish literature begins with the period succeeding the Reformation, with hymns, scriptural dramas and moral tales. A new effort began with Ludvig Holberg (1684-1754), who infused new spirit into all branches of Danish intellectual life. He was also the founder of the Danish stage. Contemporary with him was the lyric and dramatic poet Johannes Ewald. Heiberg, critic, poet and dramatist, and Jens Baggesen (1764-1826), are the chief comic dramatists of the nation. Fresh life was again infused into Danish poetry by Adam Oehlenschläger (1779-1850), contemporary with whom was Adolph Wilhelm Schack von Staffeldt, a lyric poet of high order. The greatest names in Danish literature since Oehlenschläger have been Hans Andersen (1805-1875), who won world-wide reputation by his fairy tales; Paludan-Müller (1809-1876), and Georg Brandes, critic and literary historian. It is Brandes who has, more than any other one man, introduced into Danish thought and letters modern European ideals and tendencies.

**HISTORY.** After the decline of the Roman Empire, the peoples of the Scandinavian countries began to make themselves felt throughout Europe by reason of their warlike and adven-



## Denmark

turous spirit. They conquered Normandy, successfully invaded England in the ninth century and even sent voyagers as far as America. Early in the eleventh century, Canute, king of Denmark, established a firm hold on England. He was one of the most powerful rulers of his age, and it was during his rule that Christianity was firmly established in Denmark. For three centuries following Canute, Denmark was in a state of upheaval and, although there was an occasional strong and even brilliant ruler who brought the country to something like the position it had had in Canute's time, most of the kings were weak. Margaret, called the "Semiramis of the North," ruled in Denmark from 1375 to 1412, and she gave the country a strong government. By the Union of Kalmar, in 1397, Denmark, Norway and Sweden were united under one sovereign, and Margaret's nephew, Eric, was appointed her heir. He proved, however, to have none of her great qualities, and he speedily lost his triple kingdom, each country choosing its own ruler. By 1448 the Danes, tired of the misrule, chose, as king, Christian of Oldenburg, who established the line which reigned until 1863. The choice of Christian as ruler, also, of Schleswig and Holstein, and the fact that the ruler of Holstein, which was a part of the Holy Roman Empire, had a voice in the German Diet, led centuries later to the most important consequences. See SCHLESWIG-HOLSTEIN.

During the reign of Christian II (1513-1523), Sweden, under Gustavus Vasa, gained its freedom, and it was never again united to Denmark. The latter country during the sixteenth century began to have a part in European affairs, and Christian IV (1588-1648) took an important part in the Thirty Years' War (See THIRTY YEARS' WAR). The choice of the king of Denmark was by election until 1660, but in that year the king, Frederick III, succeeded in having the kingship declared hereditary in his family.

As an ally of Napoleon, Denmark was involved in war with Sweden, England, Russia and Prussia. Copenhagen was bombarded by the British fleet in 1807, and seven years later Norway was ceded to Sweden. Holstein, feeling itself to be entirely German, had never been satisfied with the Danish rule, and when in 1846 the Danish king declared his intention of making the Danish monarchy permanently indivisible, a rebellion broke out in Schleswig and Holstein among the German element. It

## Dental Schools

was put down by 1851, though it was supported by Germany. Christian VIII had in the meantime granted to Denmark an extremely liberal constitution, but this did not allay the discontent of the German element of Schleswig-Holstein, and when in 1863 Prince Christian of Glücksburg came to the throne as Christian IX, Schleswig and Holstein declared for a different ruler. Prussia and Austria determined to unite in settling the Schleswig-Holstein matter, and war was begun with Denmark in 1864. As a result Denmark was forced to resign all claims to Schleswig and Holstein, and two years later the duchies passed finally under the control of Prussia. Of late years, perhaps the most important event in Danish history has been the necessity of allowing a constitutional government to Iceland. Denmark, through the marriage of the children of Christian IX into many reigning families of Europe, came during the latter half of the nineteenth century into very close relationship with many of the European powers. Population in 1911, 2,775,076.

**Den'nison**, WILLIAM (1815-1882), an American politician, chiefly celebrated as the "war governor" of Ohio. He was born in Cincinnati and was educated at Miami University. He began the practice of law in 1835. In 1848 he was elected to the state legislature and in 1860 he became governor of Ohio. President Lincoln appointed him postmaster-general in 1864, and he remained in that position two years.

**Den'sity**, in physics, the quantity of matter contained in a body of a given bulk, relative to the quantity contained in the same bulk of a different substance, chosen as the standard. If a body of equal bulk with another contains double the quantity of matter, it is of double the density. Or if a body contain the same quantity of matter as another, but under a less bulk, its density is greater in proportion as its bulk is less than that of the other. Hence the density is directly proportional to the quantity of matter and inversely proportional to the bulk or magnitude. The relative quantities of matter in bodies are known by their gravity or weight, and when a body, mass, or quantity of matter is spoken of, its weight is always understood, that being the proper measure of the density or quantity of matter. See GRAVITY, SPECIFIC.

**Den'tal Schools**, professional schools founded for the purpose of giving technical training in dentistry and dental surgery. The

## Dentine

first school of this sort in the world was established at Baltimore in 1839. Six years later the Ohio College of Dental Surgery was founded, and this was followed by a school in Pennsylvania; then others were organized in rapid succession. Most of the larger universities now maintain dental departments. These departmental schools and the independent schools in the United States number about sixty. The requirements for admission are a high school course or its equivalent, and most of the best schools require four years' study and practice for graduation. See DENTISTRY.

**Dentine**, den'tin. See TEETH.

**Dentiphone**, den'te fone. See AUDIPHONE.

**Den'tistry**, the art of cleaning, extracting, repairing and replacing teeth. There are two very distinct departments in dentistry, the one being *dental surgery*, the other what is known as *mechanical dentistry*. The first requires an extended medical knowledge on the part of the practitioner, as, for instance, a knowledge of diseases whose effects may reach the teeth, of the connection between the welfare of the teeth and the general system, as well as ability to discern latent diseases of the mouth. The chief operations in this department are *scaling*, or removing the tartar which has accumulated on the base of the teeth; *regulating*, the restoring of overcrowded and displaced teeth to their proper position; *stopping*, *stuffing* or *filling*, the filling up of the hollow of a decayed tooth to prevent the progress of decay; *extracting*, a process requiring considerable muscular power and delicacy of manipulation. The second department, mechanical dentistry, is concerned with the construction of artificial substitutes for lost teeth and requires much mechanical skill, it being a very delicate work to give artificial teeth a perfectly natural appearance in shape and color. The actual construction of the teeth, however, has passed largely into the hands of the manufacturers, and the dentist has only the selecting, fitting and fixing to do. In the United States, the Baltimore College of Dental Surgery, chartered in 1839, was the first school for the training of dentists, but now about sixty such institutions are in operation. *The American Journal and Library of Dental Science* was established in Baltimore in 1839. *The Dental News-Letter* was established in 1847 at Philadelphia, and in 1859 its name was changed to the *Dental Cosmos*, in which form it is now the most popular periodical in the profession. Every state has now its state

## Denver

dental society, and there are several national organizations, of which the American Dental Association is among the most important.

**Den'ver**, COLO., the capital and chief city of the state, is situated on the South Platte River at its confluence with Cherry Creek, 1026 mi. w. of Chicago, and 1457 mi. e. of San Francisco. Twelve railroads furnish excellent transportation facilities in all directions. The city is built upon an undulating plateau, 10 miles from the foothills of the Rocky Mountains and one mile above the sea, and is divided by creek and river into three sections known as East, West and North Denver. From pioneer days its favorable location and salubrious climate have made it the favorite place of residence for the live-stock growers of the plains, the mine owners of the mountains and health seekers from the East; and while smelting, meat packing, milling, brewing and other industries flourish, its residential requirements have been the chief factor in shaping the city's development. In harmony with these requirements, most of its broad and regular streets are paved or surfaced, its school buildings are of superior excellence and well equipped, and its churches, hospitals, parks and places of amusement are all maintained at a higher standard than usually prevails in cities of like size. The street car service is excellent and the supply of pure water from the mountains abundant.

City Park, in the eastern portion of the city, has an area of 320 acres and in addition to the usual features of a well-kept park contains artificial lakes, a zoölogical garden and a museum of natural history. Among the seventeen other parks, Washington, Congress and Lincoln are worthy of mention.

The most prominent structure in the city is the state capitol, occupying an eminence in the east central part of the city and constructed of Colorado granite at an expense of \$3,250,000. Other buildings worthy of mention are the union depot, the United States postoffice and customhouse, the United States mint, the courthouse, Equitable Building and Brown Palace Hotel. The important churches are Trinity Methodist and the Central Presbyterian.

Among the important educational institutions of the city are the University of Denver (Methodist), the Iliff School of Theology, the College of the Sacred Heart (Roman Catholic) and Wolf Hall (Episcopal). The city library contains about 100,000 volumes and is housed in an imposing edifice, completed in 1908.



## Denver

Denver is an important distributing point for the country west of the Mississippi River, and is the leading market of America for mining machinery.

The city was settled in 1858 as Auraria, on the west side of Cherry Creek, and as Saint Charles, on the east side. In the following year the rival villages were united and incorporated as a city and named Denver, for General J. W. Denver, who at the time was governor of the territory of Kansas, which then included Colorado. It was made the capital of the territory of Colorado in 1867, and was the county-seat of Arapahoe County until 1902, when it became "The City and County of Denver" and was vested with unusual powers and prerogatives, including a form of initiative and referendum. Population in 1910, 213,381.

**Denver, UNIVERSITY OF**, an institution of higher learning, founded at Denver, Colo., in 1864, under the name of Colorado Seminary. It comprises a college of liberal arts, a graduate school, the Denver and Gross College of Medicine, the Denver Law School, the Iliff School of Theology, the Colorado College of Dental Surgery and a college of music. The university owns and occupies twelve buildings, of which only three are in the heart of Denver, the others being at University Park, a suburb of the city. The faculty contains 175 members, the enrollment is over 1300, and the library contains 12,000 volumes.

**Department**, the name given to the principal territorial divisions of France. At the time of the French Revolution departments replaced the old provinces, the change being voted in the Constituent Assembly in 1790. There are at present eighty-seven departments, each of which is subdivided into arrondissements.

**De Pauw' University**, a Methodist Episcopal institution of higher learning, founded at Greencastle, Ind., in 1837 and named for W. C. De Pauw, by whom it was liberally endowed. It has over thirty instructors, more than 800 students and a library of 30,000 volumes.

**Depew'**, CHAUNCEY MITCHELL (1834- ), an American orator, lawyer and legislator, born in Peekskill, N. Y. He graduated at Yale in 1856; in 1861 was a member of the New York Assembly, and in 1863 was elected secretary of state of New York. In 1866 he became attorney for the Harlem Railroad Company, and he rose rapidly as a railroad lawyer. In 1882 he became second vice-president of the New York Central & Hudson River Railroad Company, of which

## De Quincey

he had long been counsel, and in June, 1885, he was elected to the presidency of the road. He was made chairman of the board of directors of the whole Vanderbilt system of railroads in 1898 and also director in many other corporations, including some of the largest companies in the country. From 1899 to 1911 he was United States senator from New York. Depew's reputation rests chiefly upon his ability as a public speaker, especially on festal occasions.

**De Peyster, de pise'ter**, JOHN WATTS (1821-1907), an American author, born in New York. Because of ill health he did not graduate at Columbia, where he studied, but later he received honorary degrees from various colleges and was elected a member of many historical, scientific, military and patriotic societies on both sides of the Atlantic. He is chiefly known for his work in the New York militia, of which organization he was brevetted major general in 1866, his help in organizing the New York fire and police departments, and his extremely numerous writings. He has written fiction; many pamphlets of military, historical and biographical kinds, and many longer works, including *The Dutch at the North Pole* and *Personal and Military History of General Philip Kearny*.

**De Quincey, de kvin'sy**, THOMAS (1785-1859), a well-known English author, born in Manchester. In 1803 he matriculated at Oxford, and it was in the second year of his course there that he began to take opium in order to relieve severe neuralgic pains. The habit gained a strong hold on him, but after years of indulgence in it he was able to shake it off partly, so that he was capable of regular work. On leaving college he settled at Grasmere, Westmoreland, in the vicinity of Wordsworth and Southey, and devoted himself to literary work. Here or in London he remained till 1828, reading voraciously and writing for the *London Magazine*, *Knight's Quarterly Magazine* and latterly *Blackwood's Magazine*. From 1828 to 1840 he lived in Edinburgh, then removed with his family to Lasswade, which continued to be his headquarters. His *Confessions of an English Opium Eater*, which was published in the *London Magazine* in 1821, first won him wide notice, and it has remained his chief contribution to literature, although many of his other works are noteworthy. Among these others may be mentioned *Murder Considered as One of the Fine Arts*, *The English Mail Coach*, *Joan of Arc*, *Literary Reminiscences*, in which he deals with Lamb, Coleridge, Wordsworth and Southey,

## Derby

as well as Shelley, Keats, Goldsmith, Pope and others; and a very interesting series of *Autobiographic Sketches*.

**Derby**, *dur'by*, CONN., a city in New Haven co., 10 mi. w. of New Haven, at the confluence of the Naugatuck and the Housatonic rivers, and on the New York, New Haven & Hartford railroad. The streams furnish good water power and the place is an important industrial center, containing manufactures of typewriters, pianos, organs, hardware, pins, firearms and various other articles. The place was settled in 1646 and was known as Paugasset until its incorporation in 1675. It was made a city in 1893 by consolidation with the borough of Birmingham. Population in 1910, 8,991.

**Derby**, a municipal borough in England, capital of Derbyshire, on the Derwent, 35 mi. n. e. of Birmingham. It has some fine public buildings, among which are the churches of All Saints and Saint Alkmund, the county hall and a school of art, a free library and a museum. The principal manufactures are lace, silk, cotton, paper, articles in Derbyshire spar, castings and porcelain. Derby is one of the oldest towns in the kingdom and is supposed to owe its origin to a Roman station, Derventio, situated at Little Chester, on the opposite side of the river. Population in 1911, 123,433.

**De Reszke**, *de resh'ke*, EDOUARD (1856- ), a Polish bass singer, brother of Jean De Reszke. He made his début in Paris in 1876. After 1884 he made several tours of the world, singing in leading operatic rôles. For more than ten years he was engaged almost continuously with the Metropolitan Opera Company of New York City.

**De Reszke**, JEAN (1853- ), a Polish operatic tenor. His voice early attracted attention, and after studying under eminent instructors he made his début in Venice in 1874 as a barytone. The appearance was far from a success, and he retired, reappearing in 1879 in the tenor rôle of *Robert le Diable*. Since that time his singing has received the highest praise.

**Der'rick**, a device for lifting heavy weights and moving them short distances. The derrick usually has a tall mast, supported by ropes attached to its top and anchored to the ground. In the foot of the mast is a strong iron pin, which fits into a socket in the base upon which it rests. A boom is attached to the mast a few feet from the ground and can have its upper end lowered or raised as desired. The boom contains the tackle blocks used in lifting the weight

## Descartes

(See BLOCK; CABLE). A rope connects the tackle block with a system of wheel work at the foot of the mast, to which the power is applied. The weight is moved by turning the mast and thus swinging the boom around. Derricks are used in stone quarries and yards and factories where heavy machinery is made, on wrecking cars of railways, in building stone walls and in the erection of large buildings. In most manufactories the traveling crane has taken the place of the derrick.

**Derrick Crane**, a kind of crane combining the advantages of the common derrick and those of the ordinary crane. The jib of this crane is fitted with a joint at the foot and has a chain instead of a tension bar attached to it at the top, so that the inclination, and consequently the sweep, of the crane can be altered at pleasure. See CRANE; DERRICK.

**Dervish**, *dur'vish* (poor), a Mohammedan devotee, distinguished by austerity of life and the observance of strict forms. There are many different orders, some of whom live in monasteries, while some lead an itinerant life, and others devote themselves to menial or arduous occupations. They are respected by the common people, and the mendicants among them carry a wooden bowl into which the pious cast alms. One of their forms of devotion is dancing, or whirling about; another is shouting or howling, uttering the name *Allah*, accompanied by violent motions of the body, till they work themselves into a frenzy and sometimes fall down foaming at the mouth. They are credited with miraculous powers and are consulted for the interpretation of dreams and the cure of diseases.

**Desault**, *de zo'*, PIERRE JOSEPH (1744-1795), one of the most celebrated surgeons of France. He became principal surgeon in the hospital De la Charité and in 1788 was put at the head of the great Hôtel Dieu in Paris. Here he founded a surgical school, in which many of the most eminent surgeons of Europe were educated. The famous Bichat was one of his pupils.

**Descartes**, *da kahrt'*, RENE (1596-1650), the first great modern philosopher. He was educated at the Jesuit College at La Flèche, where he gave evidence of remarkable intellectual power. After spending five years in Paris and eleven years in traveling and as a soldier, he settled in Holland, where he developed his philosophical system.

Early in life Descartes recognized the inconsistencies of the various systems of philosophy



and sought to found an entirely new system. He doubted all forms of existing knowledge and found the only incontestable fact to be his own existence as a doubting, thinking being. He is the originator of the expression, "*Cogito, ergo sum*" (I think; therefore I exist). Upon this principle he constructed his philosophical system by a method of reasoning essentially mathematical. Beginning with his own self-conscious existence, he established first the fundamental truth of the existence of God, by reasoning that though finite creatures, we have an idea of a perfect being; therefore such perfection must exist, for there must at least be as much reality in the cause which produced the idea as in the effect or the idea itself. The principles thus absolutely and directly known were classified as innate ideas. Descartes's course of reasoning profoundly influenced the thought of the seventeenth century and gave direction to the development of modern philosophy. He was also the inventor of analytic geometry and otherwise influenced the development of mathematics and of physical science. His most important works are *Essays* and *Principles of Philosophy*. See PHILOSOPHY.

**Descent**, *de sent'*, in law, the transmission of the title to real property to the heir, on the decease of the proprietor, by the mere operation of law. The rules of descent are fixed by state laws in the United States, but the principle determining to whom an estate belongs on the decease of the proprietor is generally that of consanguinity, or relationship by blood, though in some states the widow or widower is admitted to a share. The laws are founded upon the principle of equal distribution among heirs of the nearest surviving degree. Kindred in blood are divided into three general classes, namely, 1, descendants; 2, ancestors; 3, collateral relatives, that is, those who have descended from the same common ancestor. Lineal descendants are preferred heirs, but in lack of these, the estate goes to ancestors, and, finally, in lack of these, to collateral heirs. In the last case, the civil law computes the degrees by counting the generations up to the common ancestor, as father, grandfather, great-grandfather; and from him or her down to the collateral relative, as brother or cousin, making the degree of relationship the sum of these two series of generations. Personal property left by one dying intestate is first used to pay all debts, and the remainder is distributed by an administrator in accordance with state laws,

usually to next of kin of the deceased. By English common law it went to the administrator.

**Desert**, *dez'urt*, in its broadest meaning, a region which supports neither plant nor animal life; but as ordinarily used in geography, the term is restricted to the barren regions of the torrid and temperate zones. Deserts are found in all the continents, the most extensive areas occurring in Asia, Africa and Australia. Of all deserts, the Sahara is the most widely known. It extends across Africa from east to west between the twentieth and thirtieth parallels of north latitude, and a continuation of this region forms the Arabian Desert and the great Desert of Gobi in Asia. The Kalahari Desert occupies a large region in South Africa between the Zambesi and the Orange and Limpopo rivers. In the central part of Australia is also a large desert region. Another occurs in the northern part of Chile in South America, and in the United States there is a desert region extending from Mexico into Canada and confined mostly to the stretch of country between the Rocky and Sierra Nevada mountains. This is broken up into sections, each of which has a special name.

The surface of deserts is usually rough and contains dunes formed by drifting sand and gravel, and may contain bluffs that have been sculptured by rivers which traversed the region in former ages. In nearly all cases the soil is fertile and only needs water to make it productive. This has been amply demonstrated by irrigation in various portions of the desert of the United States and in deserts in other parts of the world. Deserts are usually caused by the location of surrounding mountain systems which cause the air passing over them to deposit its moisture on their outward slope. The Sahara is due largely to the intense heat of the atmosphere which passes over its surface. This rise in temperature so increases its capacity for moisture that it has a dry atmosphere, and under these conditions rainfall is impossible.

**Des Moines**, *de moin'*, IOWA, the capital of the state and the county-seat of Polk co., is located slightly south of the geographical center of the state, 170 mi. w. of the Mississippi and 140 mi. e. of the Missouri River, at the confluence of the Des Moines and Raccoon rivers, and on the Chicago, Rock Island & Pacific, the Chicago & Northwestern, the Chicago Great Western, the Wabash, the Chicago, Milwaukee & Saint Paul, the Chicago, Burlington & Quincy, the Minneapolis & Saint Louis and the Saint



### THE DESERT

The lower picture is the desert of hot, blinding sands. It is not entirely flat as far as the eyes can see, for hills and dunes of sand abound. In the midst of the desert are Oases, one of which, near Algeria, is shown above. An oasis may be only large enough to sustain the lives of two people, and it may be so extensive in area that two million can live upon it





## Des Moines River

Paul & Des Moines railroads and several inter-urban lines. The public buildings are the state capitol, costing \$3,000,000, the State Historical building, costing \$500,000, containing a rare collection of relics and papers pertaining to the state's history, the public library, the new post-office, the county building, costing \$1,000,000, the new municipal building, the Coliseum, seating 10,000 people and erected by popular subscription, the Auditorium, seating 3000 people and the Y. M. C. A. and Y. W. C. A. buildings. Des Moines is the home of Drake University, Highland Park College and Des Moines College. The public school enrollment of the city is 17,000 and the public school buildings have cost \$1,750,000. The city has over 90 churches.

Des Moines is governed by a system of municipal administration known as the *Des Moines Plan*. All the city affairs are handled by a council of five men, each of whom has charge of a special department (See MUNICIPAL GOVERNMENT, subhead *Commission System*). The initiative and the referendum are embodied in the Des Moines Plan.

Des Moines is the third city in the United States in the distribution of farm implements and is the great wholesale center for the state. The important manufacturing establishments include medicine works, garment factories, a large packing house, typewriter works and various other factories producing starch, flour, wagons, scales, furnaces, engines, soap, cigars, electrical appliances and numerous other articles. An army post known as Fort Des Moines is located just outside the city limits. The town of Fort Des Moines was platted in August, 1846. A new charter was adopted in 1852 and the prefix *Fort* was dropped from the name of the city. On February 16, 1857, the capital was moved to Des Moines. Population in 1910, 86,368.

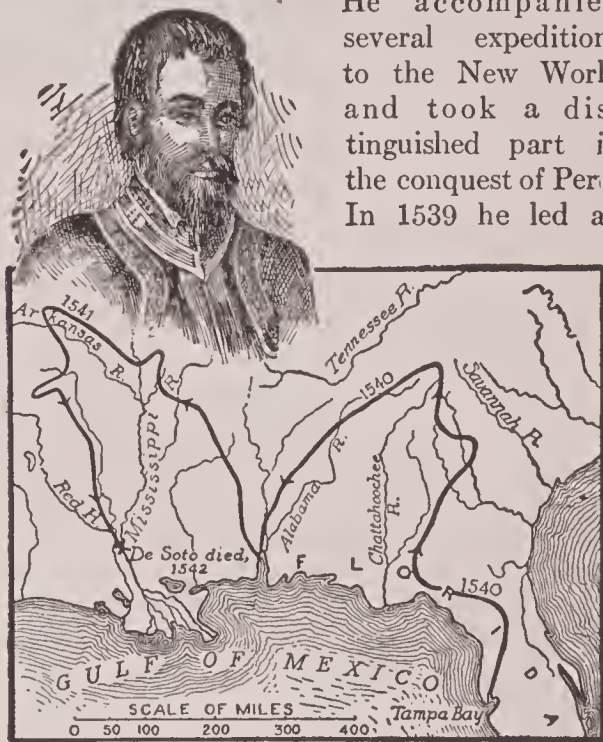
**Des Moines River**, an important river in Iowa, formed by the meeting of two streams in Humboldt co., Iowa. It flows south-southeast through Iowa, through a rich agricultural region, to a point about four miles below Keokuk and then empties into the Mississippi River. The affluents are the Raccoon, North, Middle, South and Boone rivers. Its length is estimated at 500 miles, and it drains an area of over 14,000 square miles. Des Moines, Fort Dodge and Ottumwa are the principal cities on its banks.

**De So'to**, Mo., a city in Jefferson co., 43 mi. s. w. of Saint Louis, on the Saint Louis, Iron Mountain & Southern railroad. It is in

## Detroit

a lead and zinc mining region, contains railroad machine shops, flour and planing mills and also exports grain, produce and live stock. Population in 1910, 4721.

**De Soto**, FERNANDO (1496-1542), a Spanish explorer, the discoverer of the Mississippi. He accompanied several expeditions to the New World and took a distinguished part in the conquest of Peru. In 1539 he led an



FERNANDO DESOTO AND MAP OF HIS JOURNEYING

expedition to Florida, whence, after many difficulties, he penetrated beyond the Mississippi, but was attacked with fever, died and was buried in the depths of the river. The rest of his party, scarcely one-quarter of the original number, found refuge in the coast settlements of Mexico.

**Dessau**, *des'sow*, a town in Germany, capital of the duchy of Anhalt, in a beautiful valley on the left bank of the Mulde, about 80 mi. s. w. of Berlin. It is mostly well built, with fine squares and many handsome buildings, among which is a fine grand-ducal palace containing works of the early German masters, interesting relics and antiquities. It was at the bridge of Dessau that Wallenstein won his victory over Count Mansfeld in the Thirty Years' War in 1626. Population in 1910, 56,605.

**Detroit**, MICH., the county-seat of Wayne co., chief city of the state, port of entry and ninth city in population in the United States, is situated on Lake Saint Clair, the Detroit River and the River Rouge, 285 mi. e. of Chicago, 251 mi. w. of Buffalo and 18 mi. from Lake Erie. It is on the Michigan Central, the Grand Trunk, the Pere Marquette, the Wabash and



## Detroit

the Lake Shore & Michigan Southern railroads, and is a terminal point of the Canadian Pacific, the Detroit and Toledo Short Line and the Detroit, Toledo & Ironton railroads. The city extends along the river for 11 miles, having an area of over 41 square miles, and has an extensive lake traffic in both passengers and freight. It is a port of call for lines of passenger steamers traversing lakes Huron, Michigan and Superior, and there are other lines whose boats ply regularly between this city and Toledo, Cleveland, Buffalo, Port Huron and other lake ports during the months open to navigation. Detroit is built on land that rises slightly from the river. The city is regularly laid out, one set of streets running parallel with the river, and another set crossing them at right angles. In the central and older portions of the city, however, the streets radiate from a semi-circular plot known as the Grand Circus Park, and from a second central point called the Campus Martius, and near these the blocks are somewhat irregular, a number of them being triangular. Running from the central portion of the city are three avenues which cut the other streets diagonally; these are Gratiot Avenue, Grand River Avenue and Michigan Avenue. Woodward Avenue, which divides the city into two nearly equal parts, is an important street. In the downtown district it is devoted to business purposes, but after leaving this district, it is largely a street of churches, temples, club houses and garages. Jefferson Avenue, which runs parallel with the river, is another important business and residence street.

Detroit has 31 parks and nearly 15 miles of boulevards. The largest and most noted park is Belle Isle, which includes the entire island of this name in the Detroit River, and has an area of 704 acres. It is laid out with beautiful walks, drives, flower gardens and lagoons, and contains quite a complete zoological collection, including a fine aquarium. It also has a commodious and admirably planned bathing beach. The island is connected with the city by a magnificent bridge, built at a cost of \$300,000. Grand Circus, from its location, is an important park, though it contains but  $5\frac{1}{2}$  acres. Situated as it is in the center of the business district, it affords excellent opportunity for rest. It is divided into two equal parts by Woodward Avenue. Palmer, Clark, Owen and Cass parks and the water works grounds are also worthy of mention. Besides these there are numerous interesting and beautiful places along the river, which during

## Detroit

the summer are reached by excursion steamers that ply regularly between them and the city. Elmwood and Mount Elliot cemeteries in the eastern part of the city are noted for their drives and monuments. Other cemeteries noted for their beauty are Woodmere, Woodlawn and Mount Olivet. The Grand Boulevard is a beautiful street and parkway combined, 150 feet wide and about  $11\frac{1}{2}$  miles long. It encircles the business portion of the city and is one of the thoroughfares frequented by visitors and tourists. The most important of the public buildings are the city hall, located in City Hall Square; the Federal building and the county building. The largest office buildings are the Dime Savings Bank, Ford, Penobscot, Kresge, Chamber of Commerce and Majestic; the largest hotels are the Pontchartrain and the Cadillac. Another noteworthy building is the new Michigan Central station, built at a cost of \$2,000,000. Facing the city hall is the Soldiers' and Sailors' Monument, consisting of a granite shaft, 55 feet high, surmounted by a colossal bronze statue representing Michigan. Among the churches worthy of mention are the Saint Paul's Episcopal Cathedral, Saint Hedwig's, Saint Leo's and Saint Joseph's Catholic churches, the Central Methodist, the First and Fort Street Presbyterian, the Woodward Avenue Baptist, the First Congregational and the Jewish Temple, Beth-El.

Among the educational and charitable institutions worthy of mention are the public library, having about 310,000 volumes; eleven branches of the public library; the Museum of Art; the Young Men's and Young Women's Christian Associations; the Detroit College; the Detroit College of Medicine and the Detroit College of Law. The most noted hospitals are the City General, Grace and Harper, the latter two maintaining training schools for nurses. There are also separate city hospitals for contagious diseases and a tuberculosis hospital.

Detroit is one of the most important commercial centers on the Great Lakes, since it is a convenient port for all passing steamers. The river is lined with piers and is of such depth as to admit the largest boats. The city is also an important railway center, and on the opposite bank of the river is Windsor, the meeting point of a number of Canadian railways. A tubular two-track tunnel gives passage for railway trains under the river, and railway ferries of large capacity also carry trains across.

The leading industries include the manu-

## Detroit River

facture of stoves and other foundry and machine shop products, the manufacture of automobiles and adding machines, in which Detroit leads the world, iron and steel, freight cars, tobacco products, chemicals and drugs, furniture, carriages and lumber. There are also slaughtering and meat packing establishments, and the city contains large paint and varnish works. The city has extensive dry docks, and near by are two of the largest shipyards on the Great Lakes.

**HISTORY.** The first settlement was made by the French under Cadillac in 1701, and was a fortified trading post. In 1763, at the close of the French and Indian War, the place was besieged by the Indians under Pontiac for several months, but was saved by the heroism of its defenders. During the Revolutionary War it was the headquarters for the British forces in the Northwest and the point from which numerous expeditions were sent out against the American settlers on the frontier. It was captured by the British in the War of 1812, but was regained by the Americans the following year. The city was incorporated in 1824 and was for a time the capital of Michigan Territory and of the state. It was supplanted by Lansing in 1847. Population in 1910, 465,766.

**Detroit River**, a river which runs from Lake Saint Clair to Lake Erie. It is named from the French word meaning *strait*. Its length is 28 miles, and its width is from one-half to 3 miles. The depth is sufficient for the navigation of the largest vessels. It is a great waterway, with the Saint Clair lake and river, and it is estimated that more tonnage of shipping passes through this river than through any other in the world. The river is studded with islands, and the scenery is very beautiful. The map accompanying the article **DETROIT** shows the river and its connections.

**Deuca'lon**, in classic mythology, the son of Prometheus. When, on account of the wickedness of mankind, Jupiter decided to destroy the world, Deucalion and Pyrrha, his wife, were spared because they had always been virtuous servants of the gods. When, after the deluge had subsided, Deucalion and Pyrrha came down from Mount Parnassus, they found the earth depopulated, and on seeking of the oracle at Delphi information as to how they could repopulate the earth, they received the response that they were to throw behind them the bones of their mother. As this, literally translated, would have been a sacrilege, which they knew the gods would not have commanded,

## Deviation of the Compass

Deucalion and Pyrrha decided that it referred to their mother earth. Accordingly, they threw over their shoulders stones, which on striking the earth became human beings.

**Deu'teron'omy**, the fifth book of the Bible and the last of the Pentateuch. It contains the last injunctions of Moses and an account of his death and is practically a review of the law which was given to the Israelites on Sinai, with the additions that had been made from time to time until just before the death of Moses. The book consists of three orations, each of which deals with a specific phase of the law, and closes with an account of the author's death. It is notable for the beauty of its language and the comprehensive view of the Jewish law which it contains. It is supposed that a portion of this book was the book discovered during the reign of Josiah, and because of this it was known thereafter as the Book of the Law. A thorough understanding of it involves the reading of *Exodus*, *Leviticus* and *Numbers*.

**Dev'ens**, CHARLES (1820-1891) an American jurist and soldier, born in Charleston, Mass. He graduated at Harvard in 1838, became a lawyer, and after serving for a term in the United States Senate was made United States marshal for Massachusetts. From 1861 to 1866 he served in the Union army and he was brevetted major general after the capture of Richmond. In 1867 he became a superior court justice in Massachusetts and in 1873 justice of the state supreme court. In 1877 he became attorney-general of the United States, and four years later he was again made a supreme court justice of Massachusetts.

**De'via'tion of the Compass**, the variation of a ship's compass from the true magnetic meridian, caused by the near presence of iron. When ships were built of wood, there was so little deviation that it might with safety be disregarded, but after more iron was introduced into the construction of the ships, the deviation became sensible, and now in the iron ships of the present day it is a phenomenon that must be taken into account in all cases. Whenever a ship is constructed, the action of the compass on it is carefully tested and a table of its deviations is recorded, so that the navigator may never be in doubt as to the direction in which he is steering. To lessen the deviation as much as possible, the compass is placed some distance from the deck and is surrounded by a box that tends to lessen the attraction of the ship.



## Devil

**Dev'il**, in theology, an evil spirit or being; specifically, the evil one, represented in Scripture as the traducer and the father of lies. Most of the old religions of the East acknowledge a host of devils. The doctrine of Zoroaster, who adopted an evil principle called Ahriman, opposed to the good principle and served by several orders of inferior spirits, spread the belief in such spirits among the people. The Greek mythology did not distinguish with the same precision between good and bad spirits. With the Mohammedans Eblis, or the devil, was an archangel whom God employed to destroy a pre-Adamite race of *jinn*s, or genii, and who was so filled with pride at his victory that he refused to obey God. The Satan of the New Testament is also a rebel against God. He uses his intellect to entangle men in sin and to obtain power over them and is a creature subject to omnipotent control, not an independent, self-existent principle, like the evil principle of Zoroaster. The doctrine of Scripture on this subject soon became blended with numerous fictions of human imagination, with the various superstitions of different countries and with the mythology of the pagans. The excited imaginations of hermits in their lonely retreats, sunk as they were in ignorance and unable to account for natural appearances, frequently led them to suppose Satan visibly present; and innumerable stories were told of his appearance and his attributes of the horns, the tail and the cloven foot. In consequence of the cures which Christ and his apostles performed on the possessed, the early church believed the consecration of priests gave the power to drive out evil spirits. The belief in evil spirits and witches was in the seventeenth century so common that they became the objects of judicial process. With the progress of the natural sciences, however, in the eighteenth century, many wonderful phenomena became explained, and less was heard of witchcraft. See WITCHCRAFT.

**Devil Fish**, the popular name of various fishes, one of them being the angler. In the United States the name is given to several large species of the ray or skate, common on the Atlantic and Pacific coasts and much dreaded by divers, whom they are said to devour after enveloping them in their vast wings. On the Pacific coast the name is given to the California gray whale.

**Devil Worship**, the worship paid to the devil, an evil spirit, a malignant deity or the

## Devonian System

personified evil principle in nature, by many of the primitive tribes of Asia, Africa and America, under the assumption that the good deity does not trouble himself about the world; or that the powers of evil are as mighty as the powers of good, and must in consequence be bribed and reconciled. There is a sect called devil-worshippers inhabiting Turkish and Russian Armenia and the valley of the Tigris, who pay respect to the devil, to Christ and to Allah, or the supreme being, and also worship the sun.

**Devo'nian Period**, a division of the Paleozoic era, between the Silurian and the Carboniferous periods, named from Devon, England. During this period the Continent of North America was represented by two land masses, the Appalachian and the Continental. The first extended as far south as Georgia and as far west as the Blue Ridge Mountains, while the eastern boundary was probably farther east than the Atlantic shore line. The Continental mass extended westward from the Hudson River, the shore line forming a great bay which covered the territory now occupied by western New York, Michigan and a part of Ontario. There were detached portions of land also in Colorado, the region of the Black Hills in South Dakota and the central part of Texas, and a long, narrow strip bordered what is now the great basin of Nevada and Utah. In the Old World most of Russia and Siberia were under water. The animal life included crustaceans similar to the horseshoe crab and lobster, crinoids, starfishes and various forms of mollusks; but the most characteristic life of the period was that of the fishes, which reached their highest development, and because of this, this period has been by some geologists named the *Age of Fishes*. See DEVONIAN SYSTEM; CARBONIFEROUS SYSTEM; SILURIAN SYSTEM.

**Devonian System**, in geology, a name originally given to rocks of Devonshire and Cornwall, intermediate between the Silurian and Carboniferous strata, and consisting of sandstones of different colors, calcareous slates and limestones. The formations are divided into lower, middle and upper groups. All contain fossils, but the middle most abounds in them, including corals, crinoids, crustaceans, mollusca and cephalopods. But these were all outnumbered by the fishes, which at this time reached their greatest development. Devonian rocks occupy a large area in central Europe as well as in the United States, eastern Canada and Nova Scotia. The term has been often used as equivalent to



## Devonshire

Old Red Sandstone. See CARBONIFEROUS SYSTEM; SILURIAN SYSTEM.

**Devonshire**, *dev'on shir*, SPENCER COMPTON CAVENDISH, Eighth Duke of (1833–1908), a British statesman. He was successively lord of the admiralty, secretary of war and post-master-general, before his appointment in 1871 as chief secretary for Ireland. In 1880 he was asked to assume the premiership, but he refused and served as secretary of state for India, and later as secretary of state for war, in the cabinet formed by Gladstone. When the Liberal Unionists separated from Gladstone's party on the Home Rule question in 1886, the duke of Devonshire became the leader of the new party. From 1895 to 1903 he served as president of the council, and in 1900 he was made president of the board of education.

**Dew**, moisture from the atmosphere that gathers on cool bodies, particularly at night. During the day the earth both absorbs and gives off heat, but after sunset its supply of warmth is cut off, while it still continues to radiate heat into the surrounding space. Grass, flowers and foliage, being good radiators, lose after sunset the heat which has previously been absorbed by them, without receiving any in return, and their temperature consequently falls considerably below that of the atmosphere. This lower temperature causes these objects to condense the vapor in the atmosphere surrounding them, and it is deposited upon their surfaces in the form of dew, or of hoarfrost, where the temperature of the atmosphere is below 32°.

When the sky is clouded, the heat abstracted from the earth's surface by radiation is restored by the clouds, which, being good radiators, send back an amount of heat equal to what they receive; and a balance of temperature being thus maintained between the earth and the surrounding atmosphere, no dew is formed. The formation of dew is likewise prevented by wind, which carries away the particles of air before the vapor contained in them has been condensed. Horizontal surfaces and those which are exposed to a wide expanse of sky receive a greater supply of dew than sheltered or oblique surfaces, where circumstances diminish the amount of radiation. The heavy dews which fall in tropical regions are in the highest degree beneficial to vegetation, which, but for this supply of moisture, would, in countries where scarcely any rain falls for months, be soon scorched and withered. But after the high temperature of the day, the ground

## Dewey

radiates under these clear skies with great rapidity, the surface is quickly cooled, and the water vapor, which from the great daily evaporation, exists in large quantities in the atmosphere, is deposited abundantly. This deposition is more plentiful, also, on plants, from their greater radiating power; while on hard, bare ground and stones, where it is less needed, it is comparatively trifling. In cold climates the earth, being cold and sufficiently moist, requires little dew; accordingly, the clouds, which are common in damp and chilly regions, prevent the radiation of heat, and the deposition of dew is slight. See FROST.

**Dew'ey**, GEORGE (1837–1917), an American naval officer, born in Montpelier, Vt. He graduated from the United States Naval Acad-



GEORGE DEWEY

emy in 1858 and entered the service of the United States aboard the frigate *Wabash*. In 1861 he was commissioned lieutenant and assigned to the steam sloop *Mississippi*, under Farragut. He took part in forcing the defenses of New Orleans and later lost his vessel by running her aground in a fog. In 1870 he was put in command of the *Narragansett* and made surveys on the Pacific coast for six years, and some years later he was put in command of the *Juniata*, on the Atlantic station. He next commanded the *Dolphin*, and later still the *Pensacola*, and



## Dewey

in 1896 he was promoted to the rank of commodore. When war broke out with Spain, he was placed in command of the Asiatic squadron, and he won the Battle of Manila Bay, May 1, 1898, without the loss of a man from his fleet. For this he was made a rear admiral and was given the thanks of Congress. The next year he was created admiral of the navy by special act of Congress. He returned to the United States in September and received an unprecedented popular welcome. When the Schley court of inquiry was instituted he was made its president and upheld Schley in some actions for which the court as a whole censured him.

**Dewey, JOHN** (1859- ), an American educator and psychologist, born at Burlington, Vermont. He was educated in the University of Vermont and filled successively the positions of professor of psychology in the University of Minnesota and the University of Michigan and professor of philosophy in the University of Chicago. He organized the laboratory, or practice, department of the School of Education at the latter institution, and it is called for him the Dewey School. In 1904 he was chosen head of the department of philosophy in Columbia University. Professor Dewey has become widely known through his writings and lectures. The best known of his publications are *Psychology*; *Leibnitz's Essays Concerning the Human Understanding*; *The Critical Theory of Ethics*; *Study of Ethics*; *Psychology of Number*, and *School and Society*.

**Dewey, MELVIL** (1851- ), an American librarian and educator, born at Adams Center, N. Y., and educated at Amherst College. He early became interested in library work and was the leader in the movement to found the American Library Association. He was the founder, and for five years the editor, of the *Library Journal*. Later he was chosen librarian of Columbia University, where he established the School of Library Economy and became its director. From this position he was chosen secretary of the University of the State of New York and director of the state library. He transferred the library school to Albany, where it has since remained. Doctor Dewey is considered the leading authority on libraries in the United States. He originated the decimal system of classifying books, and was one of the prime movers in the work of university extension and in establishing traveling libraries.

**De Witt', JAN** (1625-1672), a Dutch statesman. He inherited from his father a hatred of

## Diagonal Scale

the Prince of Orange and his policy. He was made grand pensionary of Holland and in this office labored to lessen the power of the House of Orange and abolish the office of stadtholder. In 1665 war with England was begun and conducted by De Witt with great ability till its termination in 1667. In 1672 Louis XIV invaded the Spanish Netherlands and involved Holland in war. De Witt's popularity, already on the decline, suffered still further in the troubles thus occasioned, and he felt it necessary to resign his office of grand pensionary. He was murdered in the same year.

**Dex'trin**, a soluble or gummy substance, into which starch can be converted by the action of dilute acids, by malt extract or by heat. By the action of hot diluted acid, dextrin is finally converted into grape sugar. It is white, insipid and without smell. It is a good substitute for gum arabic for stiffening goods and in calico printing. It is also used on the backs of postage stamps.

**Dhawalagiri**, *dah hwah lah ge're*, one of the highest peaks of the Himalayas, in Nepal. Its height is 26,826 feet.

**Di'abase**, a variety of crystalline, igneous rock composed of lime-soda, feldspar and pyroxene. The feldspar forms in long, flat crystals that usually radiate in all directions. When the grains of pyroxene are also large, a striking mottled effect is produced. Diabase is a variety of trap and is closely related to basalt. In general appearance the massive variety is hard, heavy and compact. It is found in dikes or intrusive sheets, disintegrates into irregular or spherical boulders and forms deep, red soil. Diabase containing olivine is of a green color. The pyroxene may be displaced by hornblende, and both the pyroxene and olivine, by serpentine. Among the most important formations of diabase in the United States are the copper-bearing rocks of Keweenaw Peninsula, Lake Superior; the Palisades on the Hudson and the Hanging Hills near Meriden, Conn. It also occurs in large formations in Scandinavia and southern India. See BASALT; DIKE.

**Diag'onal Scale**, a scale which consists of a set of parallel lines drawn on a ruler, with lines crossing them at right angles and at equal distances. One of these equal divisions, namely, that at the extremity of the ruler, is subdivided into a number of equal parts, and lines are drawn through the points of division obliquely across the parallels. With the help of the com-

passes such a scale facilitates the laying down of lines of any required length to the 200th part of an inch.

**Di'al.** See SUNDIAL.

**Di'alec'ti**, forms of a language differing in grammar, vocabulary or pronunciation from the language as it has been adopted in literature and in intercourse among well-educated people. Although the use of provincial dialects becomes inconvenient after a language has acquired a fixed literary standard, the study of such dialects is always valuable to the philologist for the light it throws on the history of the language. Dialects at one time differed so in England that inhabitants of one county could scarcely understand those of an adjoining one. Education and printed books have much relaxed the hold which the provincial dialects of various countries once had on the people, and in general it may be said that the educated classes of any country now speak a uniform language.

**Dialec'tic**, the old name of logic, or the art of reasoning. Hegel applied the term to the evolution of all truth, which he declared passed through three stages: The primary proposition as originally stated; the opposed proposition, and the reconstruction of these two on a higher plane of reasoning, which discloses the unity underlying the opposing extremes.

**Di'amond**, the hardest and one of the most valuable of gems, the purest form in which the element carbon is found. It crystallizes in forms belonging to the regular, or cubic, system, the most common being the regular octahedron and the rhombic dodecahedron (twelve faces). The finest diamonds are colorless, perfectly clear and transparent. Such are said to be of the first *water*. But diamonds are often blue, pink, green or yellow, and such are highly prized, if of a decided and equal tint throughout. The diamond is so very hard that nothing will scratch it—it is, in fact, the hardest substance known. The value of a diamond is much enhanced by the cutting of facets upon it, inclined at certain angles to one another, so as to produce the greatest possible play of color and luster. What is called the *brilliant* cut best brings out the beauty of the stone. Its upper or principal face is octagonal, surrounded by many facets. But this form of cutting requires an originally well-shaped stone. For other diamonds the *rose* cut is used. In this form six triangles are cut on top so that their apices meet in a point called the summit. Round this are disposed other facets. Stones which are too thin to cut

as rose diamonds are cut as *table* diamonds, which have a very slight play of color. The art of cutting and polishing the diamond was unknown in Europe till the fifteenth century, and the stone itself was not nearly so highly valued in the Middle Ages as the ruby.

The uncut diamond looks like a piece of quartz. It is of a dull white color and is full of rough seams. In this condition it is set into a matrix of wax, which is fastened to the end of a stick. The wax becomes very hard when cooled. In another matrix a cheap diamond is set, and a workman grinds the two stones together, until the one to be cut has assumed the general form of a brilliant. The dust and chips which come off are carefully collected and used afterward in polishing work. The rough stone is then firmly fixed in a matrix of metal, composed of zinc and lead, and set into a cup-shaped instrument of iron. The workman is then ready to begin cutting. In this process an iron disk turning at the rate of 2000 revolutions a minute is used. Upon the disk is sprinkled a supply of diamond dust, which sinks into the minute pores of the iron and produces the sharpest grindstone that can be made. The workman, with a magnifying glass close to his eye, grinds first the table, or top part, of the brilliant. This completed, the metal matrix is melted from the stone, which is put in, face downward, so that the exact opposite of the stone will be ground. After this, one by one, the facets, or bezils, are cut, the first two opposite and parallel, and the second two at right angles to the first two. If the diamond is large, the corners remaining between the four opposite cuts are also beveled. Then the stone is turned over in its matrix, and the facets between the girdle and the point known as the *collet* are cut in the same way. Rubies and sapphires are cut by the same general process. Moss agate, topaz, agate, amethysts and other half-precious stones are first sawed into proper sizes with a soft tin wheel. When the agate, for instance, has been sawed to the proper shape, it is smoothed down on an ordinary grindstone and is then taken in hand by the polisher, who applies it to a fine grindstone, and, after being ground for about an hour, it is ready for the market.

Diamonds are valuable for many purposes. Their powder is the best for the lapidary. They are also used for jewels in watches, as lenses for microscopes, and in the cutting of window and plate glass. When used as a glazier's tool the diamond must be uncut. Inferior kinds of



## Diana

diamonds are also extensively used by engineers in rock boring and by copperplate engravers as etching points. Diamonds are obtained from alluvial deposits, such as sands and clays, from which they are separated by washing. They are found in India, Borneo and other parts of the East, and in some localities in North America and Australia; but the chief diamond fields of to-day are Brazil and Cape Colony, the center of the latter being Kimberley, in Griqualand West, where diamonds were discovered in 1867. These mines now yield more than nine-tenths of all the diamonds produced in the world.

One of the largest diamonds known (weight 367 carats) was found in Borneo about a century ago, and it now belongs to the rajah of Mattan. One of the most celebrated is the Koh-i-noor (Mountain of Light), belonging to the British crown. It weighed originally nearly 800 carats, but by subsequent recuttings it has been reduced to  $103\frac{3}{4}$  carats. The Orloff diamond, belonging to the emperor of Russia, weighs 195 carats; the Pitt diamond, among the French crown jewels, weighs  $136\frac{1}{2}$  carats. The former, which came from India, has been thought to have originally formed part of the Koh-i-noor stone. Some of the South African diamonds are also very large, one of them of inferior color weighing 428 carats. In 1905 the largest diamond yet discovered was found in the Premier mine in Transvaal Colony. It weighed in the rough about 3000 carats, and was cut into nine large stones and a number of small ones. It was known as the Cullinan diamond.

**Dian'a**, in classical mythology, the goddess of the moon and of the chase, known to the Greeks as Artemis. She was the daughter of Jupiter and Latona and the twin sister of Apollo, born on the island of Delos. She was a maiden divinity, but that she was not entirely exempt from the power of love is shown by her treatment of Endymion (See **ENDYMION**). The strictest chastity was demanded of her worshipers, and at one time she changed Actaeon into a stag and allowed him to be torn to pieces by his dogs, because he had come upon her as she was bathing. As the goddess who presided over births, she was especially worshiped by women, and no man was allowed in her temple. In accordance with her various characters, there were differing representations of her. Most frequent are those as a huntress, with bow and arrows; as a moon goddess, with the crescent of the moon above her forehead,

## Diatom

or as the goddess of the nymphs, in a chariot drawn by stags.



DIANA—Correggi

**Diaphragm**, *di'a fram*, in anatomy, the principal muscle of respiration, completely separating the cavity of the chest from that of the abdomen. The aorta, esophagus, thoracic duct, inferior vena cava and some of the large nerves pass through it. In its natural situation the diaphragm is convex on the upper side and concave on its lower, but when the lungs are filled with air it becomes almost flat, pressing the contents of the abdomen downward and outward. It is the principal agent in respiration, particularly in inspiration. A complete diaphragm is found only in Mammalia. See **HICCOUGH**; **RESPIRATION**.

**Dias**, *de'as*, **BARTHOLOMEU** (?-1500), a celebrated Portuguese navigator. He was put in charge of an expedition to explore the west coast of Africa, and without knowing it he sailed around the southern end of the continent and found himself, to his surprise, on the east coast. The southernmost cape of the continent the Portuguese king named the Cape of Good Hope. On his return from a voyage to Brazil in 1500, Dias perished in a storm.

**Di'atom**, a suborder of minute plants, singly invisible to the naked eye, but almost univer-



## Diaz

sally distributed throughout both salt and fresh water. They are found in rain troughs, in ditches, on sand at the bottom of clear brooks, on snow and even in the dust of volcanoes. Countless millions of them exist in the water, where they form a large portion of the food of the lower marine animals. Under the microscope they are found to have hard coverings, or shells, which are exquisitely sculptured and exist in a great variety of beautiful forms.

**Diaz, de'as, PORFIRIO** (1830-1915), a Mexican soldier and statesman. For a time he studied



PORFIRIO DIAZ

law, but at the outbreak of the war with the United States he entered the army, and from that time he devoted himself to a military career. In the factional fights which disturbed Mexico for many years he took a prominent part, identifying himself with the Liberal party and proving, during Napoleon III's attempt to found an empire under French control, a most efficient leader of the patriots. In 1867 he marched to Puebla at the head of a Republican army and took the city by storm, and afterward he aided in the capture of the City of Mexico. In 1876 he became president, and he soon proved his exceptional ability. During his term the tariff was revised, finances were improved and important lines of railway were established. He was succeeded by General Gonzalez and became minister of public works, but in 1884 he was again elected president, and changes were made in the constitution so that he might

## Dickens

continue in office. Until 1911 the opposition to Diaz was not powerful enough to accomplish his overthrow, but in that year a revolution headed by General Madero resulted in the resignation of the president and his enforced departure from the country. He took up his residence in Paris, where he died.

**Dice, *dise***, cubical pieces of bone or ivory, marked on each of their six faces with dots, from one to six in number. The dice are shaken in a small box and are then thrown on the table, when the throw is counted in various ways, usually like the cards in a poker hand. The dice of gamblers are often loaded or falsified in some way, so as to make the high or the low sides turn down. Dice are of very ancient origin, being well known among the Egyptians and Greeks.

**Dickciss'el**, a handsome bird, rather larger than the majority of the sparrow family, to which it belongs, and common in the open regions of the central United States. Its back and body generally are dark, though there is a bright chestnut patch on the wing. Its throat is white; its lower parts are yellow, with a black crescent band across the breast.

**Dick'ens, CHARLES** (1812-1870), one of the great English novelists of the Victorian Age,



CHARLES DICKENS

born at Landport, Portsmouth. He received a scanty education, was for a time a mere drudge in a blacking warehouse and subsequently became clerk in an attorney's office. Having made



himself acquainted with shorthand, however, he became a newspaper critic and reporter, and later he was a contributor to the *Monthly Magazine* and the *Evening Chronicle*, in which were published the essays and tales known as *Sketches by Boz*. These were so successful that a new series was begun, and in *Pickwick Papers* a new class of characters, eccentric, indeed, but vital representations of the humors and oddities of life, such as Mr. Pickwick, Sam Weller and his father, Mr. Winkle and others, were made familiar to the public.

To *Bentley's Magazine* Dickens contributed *Oliver Twist*, a work which opened up that vein of satire of institutions which became a distinguishing feature of his work. As the special object of *Oliver Twist* was to expose the abuses of the workhouse system, so that of *Nicholas Nickleby* was to denounce the management of cheap boarding schools. Both did, indeed, do much toward correcting the abuses against which they were directed. *Master Humphrey's Clock*, issued in weekly numbers, contained among other matter the *Old Curiosity Shop* and *Barnaby Rudge*, the latter an historical tale. On his return from a visit to America, Dickens wrote *American Notes for General*



GADSHILL, DICKENS' HOME

*Circulation* and *Martin Chuzzlewit*, which dealt with his American experiences, and which contained more of his characteristic humor than any of his other works, except *Pickwick Papers*.

In 1845 Dickens went to Italy, and on his return the *Daily News* was entrusted to his editorial management; but this was an occupation uncongenial to his mind, and in a few months the experiment was given up. The *Pictures from Italy* were published the same year. Next followed *Dombey and Son* and *David Copperfield*, a work which has a strong autobiographical element, and which was Dickens's favorite among his works. In 1850

Dickens became editor of the weekly serial, *Household Words*, which was converted later into *All the Year Around*. In 1853 appeared *Black House*, an appeal against interminable suits in chancery, and this was followed by a *Child's History of England*; *Hard Times*; *Little Dorritt*; *A Tale of Two Cities*, the second of his novels with an historical setting; *Great Expectations*, the best-rounded of his works, and *Our Mutual Friend*, the last novel which he lived to finish. *The Mystery of Edwin Drood* was left incomplete at his death. During his latter years, Dickens increased his popularity by giving readings from his own writings.

In reading any of Dickens's novels, and more especially those that contain most of his peculiar wit and humor, one is impressed with the fact that he must have been a delightful companion. His humor lies so largely in the way he looked at things, the ability to put into words the incongruities which another observer might easily miss, that one feels that a walk about London with him would have afforded more amusement than the best passages of his works; and the testimony of Dickens's friends convinces us that he was in his everyday life the genial, interested man which one might expect to find him. He was of a very sociable temperament and delighted in having his friends about him. One of his most marked characteristics was the dramatic ability mentioned above and his extreme fondness for the theater. He often took part in private theatricals, and it is said that at one time an old banner-bearer at one of the theaters said to him, "Ah, Mr. Dickens, if it hadn't been for them books, what an actor you would have made!" This statement was not at all exaggerated.

The rank to which Dickens is entitled among novelists has been a question much debated. That his ability to grasp at once the most striking characteristics of a person, and his eagerness to make all men see as he saw, frequently led him into exaggeration, is true and gives ground to the charge that his characters are often caricatures. But his humor, his power of observation and his genuine love for men must be admitted, as must also the fact that many of his characters—Mr. Micawber, Sam Weller and Mrs. Gamp, for example—whether caricatures or not, fully justify their creation by the unfailing amusement which they afford. See Forster's *Life of Dickens*.

Dickinson, ANNA ELIZABETH (1842- ), an American author and lecturer, born in



Philadelphia. In 1857 she made her first venture as a speaker before the members of a society of "Progressive Friends," who were interested in the antislavery movement. In 1859 she taught school and in 1861, for about nine months, was employed at the United States mint in Philadelphia. After that time she lectured much on temperance, abolition and woman suffrage. After the close of the war she appeared mostly as a lecturer before literary societies. In 1876 she attempted to begin a theatrical career, but this venture was unsuccessful. Among her works are the plays, *A Crown of Thorns* and *True to Herself*; a novel, *What Answer?*, and *A Ragged Register of People, Places and Opinions*.

**Dickinson, DONALD McDONALD** (better known as Don M.) (1846- ), an American lawyer and politician, born at Port Ontario, Oswego, N. Y. He moved to Michigan in 1848 and graduated from the law department of the University of Michigan in 1866. He entered politics and became chairman of the Democratic state committee in 1876 and a member of the national committee in 1880. He was appointed by President Cleveland postmaster-general of the United States in 1887 and was chairman of the Democratic campaign committee in 1892. Dickinson was senior counsel for the United States before the Bering Sea Claims Commission.

**Dickinson, JOHN** (1732-1808), an American statesman and pamphleteer. He studied law in Philadelphia and at the Temple, London, and practiced his profession in Philadelphia. In 1763 he was elected to the assembly of Delaware, and later, of Pennsylvania. In 1767 he published his *Letters to the Inhabitants of the British Colonies, by a Pennsylvania Farmer*, showing that Parliament had no right to tax the colonies, but urging compromise and conciliation. They gave him a wide reputation on both sides of the Atlantic. As a member of the Continental Congress, he opposed the Declaration of Independence, believing that it was prematurely proclaimed, but he served in the army with credit. In 1779 he was elected to Congress from Delaware. In 1781 he became governor of Delaware and in 1782 was elected governor of Pennsylvania. Throughout the Revolutionary and following periods he wrote constantly on public questions, with great effect.

**Dick'son, JAMES ROBERT, Sir** (1832-1901), an Australian statesman, born at Plymouth, England, and educated in Glasgow. He removed to Australia in 1854 and entered

public life in 1872, when he was elected to the Queensland House of Assembly. He served successively as minister of public works, treasurer of the colony, secretary for railways and secretary for home affairs, before his appointment in 1898 to the office of premier. His great work, while in this position, was the passage of the measure which provided that the people should decide on the question of an Australian commonwealth. In 1900 he visited London in behalf of the proposed commonwealth. Ten days after the inauguration of the new government he died suddenly.

**Di'cotyle'dons.** See BOTANY.

**Dicta'tor**, a magistrate of the Roman Republic. The holder of this office possessed extraordinary powers and was appointed only in times of great emergency. The power of naming a dictator was vested, by a resolution of the Senate, in one of the consuls. The dictatorship was limited to six months, and the person who held it could not go out of Italy. He was also forbidden to appear in Rome on horseback without the permission of the people, and he had no control over the public funds without the permission of the Senate. He had the power of life and death and could punish without appeal to the Senate or people. All the other magistrates were under his orders.

**Dictionary**, *dik'shun a ry*, as ordinarily used, a book containing the words, or part of the words, of a language, arranged in alphabetical order, with explanations and definitions. In its wider sense, the term may be applied to a special work on one or more branches of science or art, prepared on the principle of alphabetical arrangement, such as dictionaries of biography, law, music, medicine and the like. The Assyrians, as early as the seventh century before Christ, had a dictionary of their language on clay tablets, in cuneiform characters, and the Arabians early showed that they recognized the need for such a work. These dictionaries, like those of the Greeks and Romans, were collections of rare words and meanings, rather than exhaustive collections of all the words in the language.

The first attempt to give a complete list of the words of the English language was made by Nathan Bailey (1721) in his *Universal Etymological English Dictionary*. The famous dictionary of Doctor Johnson, published in 1755, marked an epoch in the history of the English language. By this, too, was introduced the practice of illustrating the use of words by quotations from the best authors. The first great



American dictionary was published in 1828 by Noah Webster. This work has been frequently republished, and in subsequent editions has almost entirely altered its character. It is now known as *The International Dictionary* and is the standard authority in most of the states. The large American dictionary by Doctor Worcester has also made a good position for itself. Among other modern dictionaries of the English language, the most important are *The Standard Dictionary* and *The Century Dictionary*.

**Didac'tic Poetry**, that kind of poetry which professes to give a kind of systematized instruction on a definite subject or range of subjects. Thus the *Georgics* of Vergil and the *De Rerum Natura* of Lucretius profess to give, the one a complete account of agriculture and kindred arts, the other a philosophical explanation of the world. In a larger sense of the word most great poems might be called didactic, since though without obvious aim at instruction, they contain a didactic element in the shape of history or moral teaching. Thus, Milton's *Paradise Lost*, Goethe's *Faust* and the dramas of Shakespeare all have ethical lessons, which are not, however, the sole, or even the chief, object of these works.

**Diderot**, *de dro'*, DENIS (1713-1784), a French writer and philosopher, born at Langres in Champagne, and educated at the school of the Jesuits and afterward in Paris, at the College of Harcourt. His earliest works were pamphlets directed against the Christian religion, and one of them contained such open attacks on the existing ethical and social standards that it resulted in his imprisonment for some time at Vincennes. Diderot now tried writing for the stage, but his dramas were never successful. In 1749 he began, along with D'Alembert and some others, the *Encyclopaedia*, at first intended to be mainly a translation of one already published in English by Chambers. Diderot and D'Alembert, however, enlarged upon this project and made the new *Encyclopaedia* a magnificently comprehensive and bold account of all the thought and science of the time. During the time he was engaged on the *Encyclopaedia*, he wrote, besides his articles, several novels, none of which was published until after his death.

**Di'do**, daughter of a king of Tyre. After her father's death, his successor, Dido's brother Pygmalion, murdered her husband, Acerbas, or, as Vergil calls him, Sichaeus, for his wealth. Dido, however, managed to conceal this wealth,

and to escape with it to Africa, taking with her also many of the inhabitants of Tyre. Having obtained from the people of northern Africa a promise of as much land as she could cover with a bull's hide, she resorted to stratagem, cut the bull's hide into narrow strips, which she fastened together, and with this rope enclosed a large space of land, on which was built the citadel of Carthage. Vergil tells that Aeneas in his wanderings landed at Carthage and was entertained by Dido, who fell in love with him. When he was directed by the gods to depart, Dido in despair killed herself.

**Didym'ium**, a rare metallic element, which occurs, along with *lanthanum*, in the mineral cerite, was discovered by Mosander in 1843. Recent discoveries show it to consist of two elements, *praseodymium* and *neodymium*.

**Die**, a tool used for stamping metal. The die is made of the finest steel, and the design which it is to stamp is engraved upon it. Dies are used in stamping tools, coins and metals. They can be used by hand, but those used for stamping coins and medals are worked by machinery. In stamping coin, two dies are used, one above and one below, so that both faces are stamped at once.

**Di'elec'tric**, in general, an insulator or nonconductor of electricity. The term is especially applied to a nonconductor separating two conductors. See INSULATOR.

**Dieppe**, *dyep*, a seaport town of France, in the department Seine-Inférieure, on the English Channel, at the mouth of the Arques, 33 mi. n. of Rouen. Dieppe is one of the chief watering places of France. The manufactures include works in ivory, the most famed in Europe, works in horn and bone, lace-making, sugar-refining and shipbuilding. In early times Dieppe was the chief port of France, but its prosperity diminished after the revocation of the Edict of Nantes (1685). Population in 1911, 22,800.

**Die-sink'ing**, the art of preparing dies for stamping coins, buttons, medallions, jewelry and fittings. The steel for the manufacture of dies is carefully selected, forged at a high heat into the rough die, softened by careful annealing and then handed over to the engraver. After the engraver has worked out the design in intaglio the die is put through the operation of hardening, after which, being cleaned and polished it is called a *matrix*. This is not, however, generally employed in multiplying impressions, but is used for making a *punch*, or steel impression for relief. For this purpose another block of

## Diet

steel of the same quality is selected, and after being carefully annealed or softened, it is compressed by proper machinery upon the matrix, till it receives the impression. When this process is complete, the impression is retouched by the engraver and is hardened and collared like the matrix. Any number of dies may now be made from this punch, by impressing upon it plugs of soft steel. In place of this process, patterns are now frequently engraved upon rollers, for transference to sheet metal by rolling pressure.

**Di'et**, a meeting of a body of men, held for deliberation or other purposes; a term especially applied to the legislative or administrative assemblies of the German Empire, Austria and some other countries.

**Diet**, the food which is habitually eaten and drunk, to repair the waste of tissues and to support growth. The diet of persons varies much according to climate, work, age, sex, strength, state of health and individual taste. The daily quantity of the different food elements most desirable for a healthy man doing an average amount of work, is given in some diet scales as 4 ounces of proteids, 2 ounces of fats, 17 ounces of carbohydrates, 1 ounce of salt and 4 quarts of water; but this of course is subject to great variation. Slight changes are necessary for a change in climate. Hard work makes necessary an increase in all articles of diet. A diet composed largely of proteids will increase flesh. A diet of easily digested food is necessary for brain workers. The diet of a child should be different from that of a person in middle life, and that of an aged person is different from either, though it may be more nearly like that of a young child, for as activity diminishes the quantity of food should be decreased. Particular diets are necessary in certain diseases. In tuberculosis a person must eat all that he can digest of nitrogenous foods, bread with much butter, fats, olive oil, milk, cream, meats and eggs. Skim milk is valuable in diseases of the digestive organs. See **FOOD**; **DIGESTION**.

**Dietet'ics**, that part of medicine which relates to the regulation of diet. The ideal diet is clearly that which, without burdening the digestive organs uselessly, furnishes all necessary nutritive elements, with due consideration for the peculiarities of the person. No single substance contains the elements needed to replace the body's waste in their requisite proportions, and a mixed diet is therefore necessary. The nature of the food most suitable for a healthy man is

## Digester

dependent in part upon general conditions, such as climate and season, and in part upon special conditions of individual habit.

**Diffrac'tion** in physics, the spreading of rays of light, so as to form a spectrum (See **LIGHT**, subhead *Spectrum*). If a round hole is made in a shutter to a dark room, and the rays of light thus admitted are allowed to fall upon a screen, an image of the sun is formed. If this hole be reduced to a very small opening, the image bears a fringe of rainbow colors, and if the hole is changed to a slit, a similar effect is produced. By coating a pane of glass with India ink, and then with a fine needle ruling parallel lines upon this surface, as near together as possible, a *diffraction screen* can be made, which will illustrate most of the phenomena of diffraction. Glass screens with very fine rulings are prepared by the most delicate machinery, for the purpose of illustrating these phenomena in physical laboratories. The play of colors seen on the feathers of some birds and in mother-of-pearl is due to diffraction.

**Diffu'sion**, the gradual and substantial mixing of the molecules of two fluids, when brought in contact. If a glass jar is filled with water that has been slightly colored with litmus, and then a few drops of sulphuric acid are placed in the bottom of the jar, through a small tube, the color of the water will gradually change. As fast as the acid comes in contact with the litmus solution, it changes the blue to red. If the vessel is allowed to remain quiet, the line of red slowly rises, until the blue has been entirely changed, showing that the acid has freely mixed with the water and changed the contents of the jar to a weak acid. Alcohol and water placed in a vessel will mix in a similar manner, but such liquids as oil and water or water and mercury, which have no adhesion between their molecules, will not mix. Gases diffuse in a similar manner. If two jars be placed with their mouths together, the lower filled with chlorine and the upper with hydrogen, in a short time the gases will be similar in both jars, though hydrogen is much the lighter gas.

**Digest'er**, a strong vessel of copper or iron, on which is screwed an air-tight cover, with a safety valve, the object being to prevent loss of heat by evaporation. Water may be thus heated to 400° F., at which temperature its solvent power is so greatly increased that bones are converted into a jelly. A common use of the digester is in the preparation of wood fiber for the manufacture of paper. See **PAPER**.



## Digestion

**Digestion**, *di jēs'chun*, the preparation of food for its absorption by the blood and lymphatic vessels begins in the mouth, where the saliva dissolves the salts and sugars taken in a solid form, and by its active principle, ptyalin, changes starch into sugar. In the stomach the salivary digestion may continue for some time, or till the presence of the free acid there stops the action of the ptyalin. The food, subjected in the stomach to a slight churning process, is mixed with the gastric juice, the active principle of which is pepsin. It digests albumens, changing them into soluble peptones. It does not affect the starches that have escaped the action of the ptyalin the sugars or the fats. Milk is curdled by the acid of gastric juice and by a ferment called *rennin*. The average time occupied in the digestion in the stomach is from three to four hours but the quantity and quality of the food, muscular exertion, bodily health and the condition of one's mind have a great influence on the time. When the *chyme*, the partly digested food, passes through the pylorus into the small intestine, the last stage of digestion begins. The pancreatic juice through its ferment, *trypsin*, finishes the work of the gastric juice in converting proteids into peptones. It completes the work of the saliva in converting starch into sugar, and the bile changes the fats and oils into a soapy substance. The intestinal juices complete the work, and *chyle*, the digested food, is ready for absorption. In the large intestine there is but little digestion carried on, though what has escaped the small intestine may be completed there. See ABSORPTION; CHYLE; FOOD; SALIVA.

**Dighton**, *dī'ton*, **Rock**, a large boulder near Dighton, Mass., bearing an inscription which has been the object of much controversy among antiquarians. It was first believed to have been made by the Norse, but authorities now generally agree that it was written by Algonquian Indians.

**Digit**, *dij'it*, in arithmetic, any one of the ten numerals, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. It is also a measure of a finger's breadth, equal to about three-quarters of an inch. Digit in anatomy is any one of the fingers and toes. In astronomy it is a unit of measure equal to one-twelfth the diameter of the sun or moon and used in estimating the quantity of an eclipse; that is, if the eclipse obscures one-half the diameter of the planet it is an eclipse of six digits.

**Digitalis**, *dij'i ta'lis*. See FOXGLOVE.

**Dijon**, *de zhohN'*, a town in eastern France, capital of the department Côte d'Or, at the con-

## Dilemma

fluence of the Ouche and Luzon rivers, about 150 mi. s. e. of Paris. It is beautifully situated and is surrounded by handsome parks. Among the interesting buildings are the cathedral, the palace of the dukes of Burgundy, used now as the townhall, and several churches. The industries include the manufacture of woollens, hosiery, candles, mustard, vinegar, chemicals and paper hangings, and there are, also, tanneries, foundries, machine factories, cotton mills and oil mills. Dijon dates from Roman times. The Burgundians possessed it in the fifth century, and later it was secured by the Franks. In the eleventh century it was part of the duchy of Burgundy, and in 1477 it was annexed to the crown of France. Population in 1911, 76,487.

**Dike**, in geology, the name of an elongated, narrow body of igneous rock that has been formed by molten rock being forced into fissures, where it solidified. Dikes vary from a few inches to a hundred feet or more in thickness. The rock in thin dikes is usually more compact, because of the quick cooling. The rocks disturbed may be sedimentary or igneous, and the dike is usually of a different degree of hardness from the rock upon either side. When harder, it forms ridges as the surrounding rock is worn away, and large dikes often cause great unevenness of surface. Dikes should be distinguished from veins which contain ore deposited from solution; but some dikes are formed from molten matter that contained vapor of water and some acids, as hydrochloric. Quartz porphyry and basalt are the most common dike rocks. Dikes are found in all regions that have been subjected to volcanic action. See DIABASE; ROCKS; VOLCANO.

**Dilem'ma**, in logic, an argument in which the same conclusion may be drawn from two contrary propositions. The following is one of the most famous of the classical dilemmas: A young rhetorician said to an old Sophist: "Instruct me in pleading, and I shall pay you when I gain a cause." The master sued for the reward, and the scholar eluded the claim by a dilemma. "If I gain my cause I shall not pay you, because the award of the judge will be against you. If I lose it I may withhold it, as I shall not have gained a cause." The master replied: "If you gain you must pay me, because you promised to pay me when you gained a cause; if you lose you must pay me, because the judge will award it." The two results which are found equally objectionable are called the *horns* of a dilemma.

**Dilke**, *dilk*, CHARLES WENTWORTH, Sir (1843–1911), an English politician and author. He studied at Cambridge and after his graduation traveled in the United States, Canada and the East. The result of these travels was a book entitled *Greater Britain: a Record of Travel in English-speaking Countries during 1866–67*. In 1868 he was elected to Parliament, and he served as under-secretary of state for foreign affairs and president of the local government board. The passage of the measure allowing municipal franchise to women was due largely to him.

**Dil'lon**, JOHN (1851– ), an Irish politician. He was elected to Parliament for Tipperary in 1880, and his open expression of his radical views led to his imprisonment for several years. In 1885 he was elected to Parliament for East Mayo, and has been regularly reelected. From 1896 to 1899 he was the leader of the Irish nationalist party.

**Dim'ity**, a fine cotton fabric, with a ridged surface ornamented in the loom either by raised stripes or by fancy figures. White is a common color used, especially in bed covers and bedroom furniture.

**Dinapur**, *de nah poor'*, a town in the Patna district, Bengal, British India, on the right bank of the Ganges, about 12 mi. n. w. of Patna. It is the cantonment and military headquarters of the district and has extensive barracks. There are handsome bungalows in the neighborhood. Population in 1911, about 40,000.

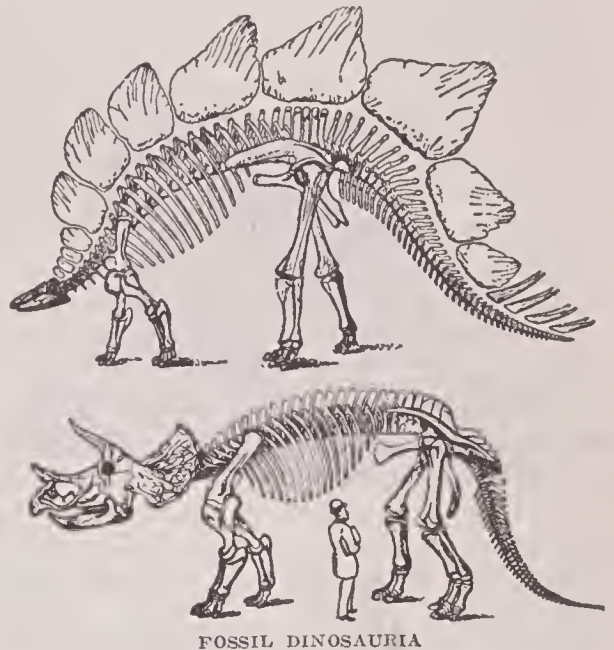
**Ding'ley**, NELSON, Jr. (1832–1899), an American journalist and legislator, born at Durham, Me., and educated at Dartmouth College. He became editor and proprietor of the *Lewiston Journal* in 1856; he was a member of the lower house of the Maine legislature for five terms, during two of which he was speaker, and was elected governor in 1874. In 1881 he was chosen to Congress and continued to be a member of the House of Representatives until his death. The tariff schedule of 1897, known as the "Dingley Tariff," was framed under his direction. At his death he was chairman of the ways and means committee.

**Din'go**, the native wild dog of Australia, extremely fierce and of a wolf-like appearance. It is remarkable for being the only dog existing both wild and domesticated. The natural cry of the dingo is a wolfish howl, but when kept with dogs it learns to bark. The ears are short and erect, the tail is rather bushy and the hair is of a tawny color. The dingo is very destructive to sheep and small domesticated animals.

**Dinoceras**, *di nos'e ras*, a fossil mammal, found in the Eocene strata of North America, in some respects akin to the elephant and of equal size, but without a proboscis.

**Dinor'nis**, an extinct genus of large wingless birds, classed with the ostrich family. The bones of five species have been found in New Zealand. The largest must have stood at least 14 feet in height. Several of its bones are at least twice the size of those of the ostrich.

**Di'nosau'ria**, a group of very large lizards intermediate between the ostrich-like birds and the lizards. The majority, as the *Megalosaurus*,



which attained to 40 feet in length, were carnivorous; the *Iguanodon*, however, was herbivorous. They were the land reptiles of the Jurassic and Cretaceous periods. See *IGUANODON*.

**Di'nothe'rium**, a genus of extinct gigantic mammals, the remains of which occur in Tertiary formations in several parts of Europe. The *dinotherium* was related to the mastodon and the elephant, both of which it is supposed to have resembled, but no complete skeletons of the animal have been found.

**Din'widdie**, ROBERT (1690–1770), a colonial official in America, born in Scotland. He was governor of Virginia from 1752 to 1758, but was recalled, after precipitating the French and Indian War and, by his ill temper, avarice and incompetence, rendering himself generally unbearable to the Americans.

**Di'ocle'tian**, emperor of Rome, a man of low birth, who was raised to the imperial power by the army in 284 A. D. He appointed Maximian as his colleague, and chose two assistants, known as *Caesars*, who were to receive the



## Diogenes

succession. Under these four the Romans won numerous victories. Diocletian and Maximian resigned the power to their subordinates in 305.

**Diogenes**, *di oj' e neez*, (412-323 B. C.), the most famous of the Cynic philosophers. Having been banished from his native place with his father, who had been accused of coining false money, he went to Athens and thrust himself upon Antisthenes as a disciple. He despised all philosophical speculations and opposed the corrupt morals of his time. Diogenes exposed the follies of his contemporaries with wit and good humor. As an exemplar of Cynic virtue he satisfied his appetite with the coarsest food, practiced the most rigid temperance, walked through the streets of Athens barefoot, without any coat, with a long beard, a stick in his hand and a wallet on his shoulders, and by night, according to the popular story, slept in a tub. See CYNIC SCHOOL OF PHILOSOPHY, THE.

**Diomedes**, *di' o mee' deez*, in Greek mythology, a king in Thrace who had a number of mares, which he fed on human flesh. All strangers who entered his territory were thrown to these animals to be devoured, until Hercules, overcoming Diomedes, fed him to the horses, which he afterward carried off. A second Diomedes was one of the heroes at the siege of Troy, chiefly noted for having helped Ulysses carry off the Palladium.

**Dionæa**, *di' o ne' ah*. See VENUS'S FLYTRAP.

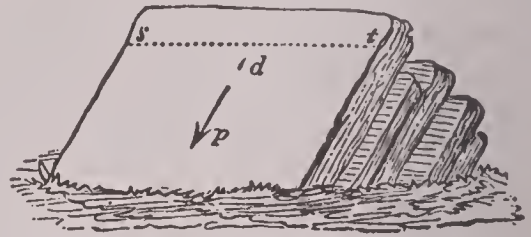
**Dionysius**, *di' o nish' i us*, the Elder (431 ?-367 B. C.), tyrant or absolute ruler of Syracuse, a man of obscure parentage. He served in the army, obtained the rank of general and afterward of commander in chief and, gaining the support of the army, seized the supreme power in Syracuse when he was but twenty-five years of age. He extended his rule over other cities in Sicily; and after some successes and reverses in the struggle with the Carthaginians he gained a complete victory over them under the walls of Syracuse. As a patron of art and learning he made Syracuse a brilliant center of Grecian civilization.

**Dioram'a**, a mode of painting and of scenic representation, invented by Daguerre and Bouton and first exhibited in 1822. It secures a higher degree of illusion than the ordinary panorama, by a mode of uniting transparent painting with opaque painting and causing the light to fall upon the picture both from before and behind. At the same time, by means of colored transparent blinds, suspended both

## Diphtheria

above and behind the picture, the rays of light are transmitted and reflected so that a great variety of effects is produced. This method has been used with great success on the stage, in producing fine scenic effects. See PANORAMA.

**Dip**, in geology, the name given to the angle of slope of inclined rock strata, as *dp* in the diagram. The dip is measured in degrees and is determined by an instrument called the clinometer, which is a square block of wood having a graduated arc and a plummet attached



to one corner. When the block is applied to the rock, so that the plummet is suspended at the highest point, its position on the arc gives the number of degrees of dip. The horizontal direction at right angles to the line of dip is called the *strike*, shown by *st* in the diagram.

**Diphtheria**, *dif the're ah* or *dip the're ah*, an infectious and exceedingly dangerous disease, which usually attacks the young in preference to the old. It is caused by a bacillus which has been identified, and the mode of infection is well understood (See GERM THEORY OF DISEASE). In diphtheria the throat is inflamed, and a false membrane forms on the surface. It is not always easy to identify the disease in its early stages, and it is probable that many cases are not properly understood. Diphtheria causes great weakness and nervousness and is frequently accompanied by other diseases, and paralysis may follow at any time within a few weeks after the attack. In every case the patient should be rigidly isolated from every one but the physician and nurses, and placed in a room with as little and as simple furniture as is consistent with comfort. When the patient has recovered, the clothing and furniture should all be thoroughly disinfected, as the germ will remain alive for some time. Within recent years serious epidemics have been prevented by the isolation of patients, and the severity of attacks has been lessened wonderfully by early inoculation with an antitoxin prepared for that especial purpose (See SERUM THERAPY). Physicians claim that if the antitoxin is administered in time, it is almost as certain a specific as vaccination is for smallpox.



## Diphthong

**Diphthong**, *dij'thong* or *dip'thong*, a coalition or union of two vowels in one syllable. In uttering a proper diphthong both vowels are pronounced, but the two sounds are so blended as to form one syllable, as in *void*, *bough*. The term *improper diphthong* is applied to the union in one syllable of two or more vowels, of which only one is sounded, as in *bean*.

**Diplo'macy**, the science or art of conducting negotiations between nations; the branch of knowledge which deals with the relations of independent States to one another; the agency or management of envoys accredited to a foreign court; the forms of international negotiations. Cardinal Richelieu is generally considered as the founder of that regular and uninterrupted intercourse between governments which exists at present between almost all the Christian powers, though the instructions given by Machiavelli to one of his friends, who was sent by the Florentine Republic to Charles V (Charles I of Spain), show that Richelieu was not the first to conceive the advantages that might be derived from the correspondence of an intelligent agent at the seat of a foreign government. Diplomatic agents are of several degrees: 1, ambassadors; 2, envoys extraordinary and ministers plenipotentiary; 3, ministers resident; 4, *charges d'affaires*; 5, secretaries of legation and *attaches*. See **MINISTERS, FOREIGN**.

**Dip'per** or **Water Ouzel**, a remarkable little singing bird, closely related to the thrushes,



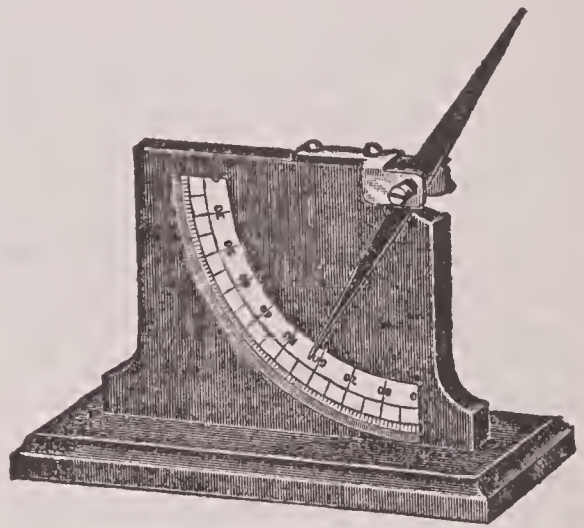
EUROPEAN DIPPER

but resembling the wrens in appearance, especially in its up-tilted tail. It is covered with very close, water-proof plumage and lives about streams, often in the vicinity of waterfalls, into

## Directory

which it dashes in a perfectly fearless manner. At times it goes entirely through a cascade and finds in the crevices of the rocks back of the water, dry places where it can build its dome-shaped nests and rear its young. The dipper is a rather dark bird with a white breast, and as it moves about it jerks its tail upward and bobs its head downward. There are several species of dippers found in Asia, northern Europe and the highlands of western United States.

**Dip'ping Nee'dle**, a magnetic needle, so mounted that it can move only in a vertical



DIPPING NEEDLE

direction. The dipping needle is used to test the force of the earth's magnetism at different places on its surface. In the northern hemisphere the north pole dips downward, and in the southern hemisphere, the south pole. At the magnetic equator the needle maintains a horizontal position, but as it is moved north or south from this line it dips downward, the degree of declination indicating the strength of the magnetism. At the magnetic poles the dipping needle assumes a vertical position.

**Dip'soma'nia**, a species of insanity, in which the patient has at times an ungovernable craving for liquor, which he indulges without restraint. On all other subjects the dipsomaniac may be wholly sound, and between the attacks of his mania he may be an irreproachable person, with a marked aversion to alcohol in any form.

**Dip'tera**. See **INSECTS**.

**Dirac'tory**, the name given to the executive body of five men provided for by the Constitution passed in France in 1795. One member of the Directory was to retire each year to make way for a new member. Although in its dealings with internal affairs this body was unpopular from the first, it maintained its power for a



time, owing to the fact that in the early part of its rule the French armies were largely successful. The failure of its military policy made it easy for Napoleon to overthrow it in 1799. See NAPOLEON I.

**Dis'count**, the charge made by a banker for advancing money on a bill or other document, not yet due. From the face value of the instrument, including interest at maturity, the banker deducts a charge, pays the difference, which is called the *proceeds* of the bill, to the person parting with it, and collects the full amount, when due, to reimburse himself. Popularly, the term *discount* is applied to any deduction from the full amount of an account, made by the party to whom it is paid, especially on prompt or early payment.

**Dis'cus**, THROWING THE. See ATHLETICS.

**Disease**, *diz eez'*, ill health not caused by old age. Diseases are frequently classified as *functional* and *organic*. In the former the organs are sound, but from some cause do not work properly; in the latter, the tissues of the organs are not healthy. The most important diseases arise from the presence in the organs of bacteria and of poisonous products formed by foreign substances. See GERM THEORY OF DISEASE; MEDICINE; SURGERY.

**Disciples of Christ**. See CHRISTIANS.

**Disease**, GERM THEORY OF. See GERM THEORY OF DISEASE.

**Diseases of Plants**. A knowledge of plant diseases is of the greatest importance to the farmer. It is estimated that losses amounting to millions of dollars result every year from certain plant diseases. They are generally due to one of the following four causes: fungi, bacteria, insects or physiological causes.

There are fungi which live wholly within the tissues of the plant, those that throw their spores in the air and those that live in the open air, fastening their rootlets to the plant and penetrating openings in the epidermis. When once the plant is attacked, the diseases progress with great rapidity. Familiar examples of diseases by fungi are rusts and smuts of corn, potato rot and mildews (See RUST; GALLS; MILDEWS).

In bacterial diseases insects visiting the plant introduce into the cells bacteria, which, when once they have gained entrance, seem to be beyond control of remedy and cause the injury or death of the plant without delay. It is impossible to cure plants when once infected by bacteria, but it is possible to prevent the spread of the disease to the other plants, by utterly

destroying those which are diseased. The chief examples of these diseases are fire blight of apples and pears, black rot of cabbage, and celery disease, tomato disease and sweet corn disease.

Certain insects, such as the eelworms or the phylloxera, attack various plants. The phylloxera attack grapes and have been very injurious to whole vineyards in Europe. Orange trees, roses and cucumber plants are also subject to the attacks of these worms. It is said that lime is a good remedy, and in greenhouses it is possible to free the soil from infection by baking or freezing it.

The physiological diseases are generally caused by unsanitary conditions, such as improper soil or lack or excess of light or water. The leaves generally turn yellow and drop, and the whole plant assumes an unhealthy appearance.

**Dismal Swamp**, a large tract of marshy land in the United States, beginning a little south of Norfolk, Virginia, and extending into North Carolina. It is 40 miles long and 25 miles wide. This tract was entirely covered with trees, with almost impenetrable brushwood between them, but it has now in part been cleared and drained. In the midst of the swamp is Lake Drummond. A navigable canal through the swamp connects Chesapeake Bay and Albemarle Sound.

**Dispen'sary**, a place where free medicines or free prescriptions are given to poor patients who are able to call for them. In all the large cities of the country such places are supported by private funds, or as a regular branch of public benefaction. Though often found to be abused by the well-to-do, the practice is of such service to the poor that it is far better to regulate it carefully by law than to do away with it.

**Disraeli**, *diz ra'ly*, BENJAMIN, Earl of Beaconsfield (1804-1881), an eminent English statesman and novelist, of Jewish extraction, the eldest son of Isaac Disraeli. In 1826, after an unsuccessful trial of the law, he brought out his first novel, *Vivian Gray*. He then traveled for several years in Italy, Greece, Turkey and Syria, but some political pamphlets which he had published and which had won some attention turned his desires towards politics, and immediately on his return to England he became a candidate for member of Parliament. First he tried to enter the House as a Radical, but finally in 1837 he succeeded in entering Parliament as Tory member from Maidstone. During his first years in Parliament he supported Peel,

but when Peel gave his support to the repeal of the Corn Laws, Disraeli withdrew from his party and soon became recognized in the House as leader of the protectionists. Some years later, feeling that the people did not wish longer a protection policy, he abandoned it. In 1868 Disraeli became prime minister, but his party was defeated at the next election, and not until 1874 did he again come into power. This time, however, he had come in with a strong Conservative majority, and he remained in power for six years. Among the more important events of his premiership was the gaining control of the Suez Canal, the proclamation of Victoria



BENJAMIN DISRAELI

as empress of India and the compelling of Russia by the Treaty of Berlin to abandon a part of her ambitious plans against Turkey. During his term as prime minister, too, Disraeli entered the House of Lords as earl of Beaconsfield. His party was defeated in 1880, and Disraeli withdrew into private life. Much of his power in Parliament he owed to his extraordinary powers as a speaker, and that this was wholly an acquired ability is shown by an incident of his early days in the House of Commons. When he attempted to make his first speech, he was so grandiloquent in manner that he was laughed down. Greatly chagrined, he exclaimed, "I will sit down now, but the time

is coming when you shall hear me."

Disraeli's novels, most noteworthy among which are *Henrietta Temple*, *Coningsby*, *Tancred*, *Sibyl* and *Lothair*, are of great interest, because they deal, from the point of view of an insider, with the society of the aristocracy in Disraeli's day. He did not hesitate to introduce into his books many of the foremost men of the time.

**Disraeli**, ISAAC (1766-1848), an English man of letters, father of Benjamin Disraeli. The cordial reception accorded his *Curiosities of Literature*, published in 1791, determined much of his after work. Between 1812 and 1822 appeared his *Calamities of Authors*, *Quarrels of Authors* and *Inquiry into the Literary and Political Character of James I*, the three being afterward published collectively under the title of *Miscellanies of Literature*. In 1828 appeared the commencement of his *Life and Reign of Charles I*, a work completed in 1831.

**Dis'taff**, the first instrument employed in spinning. It consisted of a staff, on one end of which the wool or flax was rolled. The spinner held the distaff in the left hand and drew out the fibers with the right, at the same time twisting them. A small piece of wood, called a spindle, was attached to the thread, the weight of which carried it down as new thread was formed. When the spindle reached the ground, the thread which had been spun was wound round it, and it was then again fastened near the beginning of the new thread. The distaff used with the spinning wheel for flax was made by taking the end of a balsam or other evergreen branch, bending the short twigs back and tying their ends together, thus forming a cone-shaped structure upon which the flax was wound.

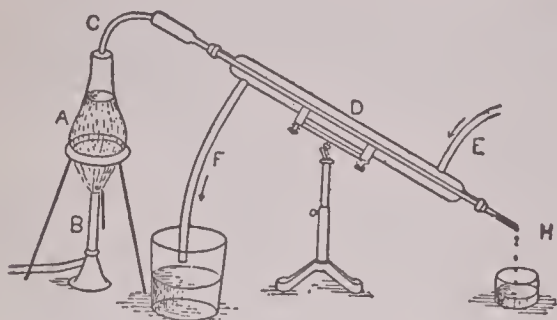
**Distem'per**, a method of painting, in which the colors are mixed with glue, white of egg, gum water or similar substances. This liquid dries very rapidly, so that it is difficult to blend the tints. Distemper is now used in scene painting and in the preparation of wall paper, but before the introduction of oil painting in the fifteenth century it was used in the higher departments of art.

**Dis'tilla'tion**, a process by which vapors from boiling liquids can be condensed in suitable vessels and thus purified. For example, if water contains certain impurities in solution, it is possible to separate the water from the impurities by boiling the mixture and condensing the water vapor, which is pure. The other



## Distilled Liquors

substances are left behind. The apparatus in which this distillation takes place is called a *still*. In the accompanying figure *A* is a reservoir in which the mixture is placed, *B* a lamp



or other source of heat, *C* a tube leading through *D*, a tank containing cold water, and *H* the vessel that receives the condensed liquid. Cold water flows into *D* through *E* and runs out through *F*.

**FRACTIONAL DISTILLATION.** A mixture of substances which boil at different temperatures can be separated by placing the mixture in the flask *A*, placing a thermometer through the opening and heating to the lowest temperature at which one of the substances will boil. The condensed vapor is free from the other substances. When no more vapor comes over at this temperature, the heat is increased and the substance having the next higher temperature comes off. In this way the different substances may be separated from each other.

**DESTRUCTIVE DISTILLATION** is not the same as ordinary distillation. In the latter case the substances that boil off are not changed chemically from what they were in the mixture. But in the case of destructive distillation the substances are changed chemically when they are distilled. Wood and coal are the substances usually employed in this kind of distillation. Wood, heated in a closed vessel, is changed to charcoal, while impure acetic acid, tar and some other bodies are driven off and condensed. Coal so heated gives coal gas, and ammonia fumes are driven off, but not condensed; tar is driven off and condensed; coke is left behind.

Distillation is a process used extensively in the arts, as in the making of alcohol and the refining of petroleum.

**Distilled Liquors**, alcoholic liquors manufactured by the combined processes of fermentation and distillation. They may be made from raw material or directly from material which has been fermented, as in the manufacture of brandy by distilling wine. Most of the liquors, such as rum and whisky, are made

## District of Columbia

directly from the raw material, corn, wheat and other grains being used. In some countries potatoes are used instead of grain. The grain is ground and soaked in warm water, preparing what is called the *mash*. Yeast is then added to this, and it is allowed to ferment, forming the *wort*. From this the spirit is distilled (See **DISTILLATION**). The distilled spirit usually contains numerous substances that are not desirable, and these are removed by redistilling at different temperatures or by allowing the liquor to stand for a long time, when they are either absorbed or evaporated. The purification is generally known as the process of rectifying. Rum is made directly from fermented molasses. See **BRANDY**; **WHISKY**.

**D'Istria**, *de'stre ah*, DORA. See DORA D'ISTRIA.

**Dis'trict of Colum'bia**. Provision for the location of the District of Columbia was made in the Constitution of the United States, which decreed that Congress should have power to



exercise exclusive legislation over a tract not exceeding 10 miles square. Both Maryland and Virginia passed acts ceding such a tract to the United States, and in 1790 Congress passed a bill which established the tract upon the Potomac River, but left the President to locate it. This action of Congress, however, was not taken until after a very bitter debate among the members of Congress, many of whom felt it unwise to locate the seat of government in the

## Diver

midst of a comparative wilderness. But time has justified, in the minds of the public, the judgment of Washington in fixing upon "the only plot in the United States which had tide-water navigation, convenient access from Baltimore and other large cities northward, and superb natural sites." Originally, the tract contained exactly 100 square miles, a portion being on the south side of the Potomac, but this was ultimately ceded back to Virginia, and the present tract only, whose area is about 69 square miles, was retained. Besides Washington, Georgetown and Uniontown, there are within the District of Columbia several smaller villages (See WASHINGTON). The government of the District is in the hands of three commissioners, two of whom are civilians, directly appointed by the President, and the third, an army engineer detailed by the secretary of war. They hold office three years and are empowered by Congress to make and change at will health and police regulations and to make various laws governing the cities. They appoint all subordinate clerks and officials. Each year they submit to the secretary of the treasury an estimate for all the expenditures of the District during the next year. Half of this amount is assessed as a tax upon the District, and the other half is appropriated by Congress. The population of the District in 1910 was 331,069, of whom about 100,000 were colored.

**Di'ver**, a water bird related to the grebe. The name is also given to other birds that are skilful divers. The true divers live mostly in the Arctic regions, but come south in winter. The *great northern diver* and the *red-throated diver* are the most common species. The former has a white breast and a black back and wings, marked by white spots that present a checker-board appearance, while the head and neck are glossy black and green, the latter with a collar of white streaks. The red-throated diver is duller in its coloring. In Scotland this bird is called the *rain goose*, while in the United States the great northern diver is generally



GREAT NORTHERN DIVER

## Divine Right of Kings

called the *loon*. The loon nests as far south as the Great Lakes, and most of the small lonely interior lakes of that latitude have one or two pairs of loons during the summer season. Their cries are peculiarly noisy ones, some of their notes resembling rough, jeering laughter. If suddenly startled, especially when they have young in charge, they go through the most astonishing antics on the surface and below the water, trying evidently to distract the attention of their enemy.

**Divide'**, in physiography the name given the crest or water-parting which separates two river systems, or the drainage areas of two smaller streams. The term *watershed* is also used to indicate the same feature. A divide may be comparatively low land, with slopes so gentle that they can scarcely be traced, as the Height of Land, which extends east and west across the central plain of North America and separates the Mississippi basin from that of the rivers flowing into Hudson Bay. It may be very high, like the divide in the Rocky Mountains, that separates the rivers which flow into the Mississippi basin from those flowing into the Pacific. Rivers sometimes cut transverse valleys through a high divide; but this never occurs with a low divide, unless in a few localities the level may be such that in high water one portion of the stream flows down one slope and another portion flows down the other. This is illustrated in the case of Twin River Lake in Yellowstone Park and the Cassiquiare River in South America.

**Div'ina'tion**, the act of divining or foretelling future events or discovering things secret or obscure, by the aid of superior beings or by other than human means. In ancient times divination was divided into two kinds, natural and artificial. *Natural* divination was supposed to be effected by a sort of divine inspiration; *artificial* divination was effected by certain rites, experiments or observations, as by sacrifices, observation of entrails and flight of birds, lots, omens and the position of the stars. This sort of divination was practiced by the conjurers, or medicine men, of the American Indians, and traces of it are still found among some tribes. The dreams and visions mentioned in the Old Testament were undoubtedly a sort of divination.

**Divine Right of Kings**, the claim set up by some sovereigns or their supporters, that they are ruling by appointment of God, inasmuch that, although they may themselves submit to restrictions on their authority, yet a



## Diving

subject resisting their acts is considered guilty of a sin. This doctrine, so celebrated in English history, especially in the time of the Stuarts, and in French history of Louis XIV's time, is now rarely defended.

**Di'ving**, the act of working under water, either with or without a supply of air. In the tropical regions the natives on the shore and those living on islands become expert divers in their quest after sponges and other salable articles obtained from the sea. Some of these are able to remain under water for two minutes, but they suffer from the effects of holding their breath so long.

The oldest successful diving apparatus, known as the *diving bell*, consists of a dome-shaped iron enclosure, open at the bottom and having a shelf or seat on which the diver can sit. When lowered into the water the air prevents the water from filling the chamber, and workmen can remain under water in a diving bell for a number of hours, provided they are supplied with fresh air. This is done by forcing the air into the bell through a tube connected with a force pump, while another arrangement allows the foul air to escape.

The diving bell has been replaced by the diving dress, which is a rubber suit so constructed as to protect the diver from the water. The suit is surmounted by a copper helmet which screws on at the neck and has glass windows in front. In the old-style dress there are also two attachments for tubes that extend to the surface. Through one of these tubes the diver is supplied with fresh air, and through the other the foul air escapes. In the more recent patterns a cylinder for containing compressed air and a compound of soda for absorbing the carbon dioxide from the impure air is found. This cylinder is placed on the shoulders and with it the diver can remain under water for hours without depending upon those above the surface. When he wishes to ascend he lets the air from the cylinder escape into the suit and inflate it until he is able to rise to the surface. All diving suits are heavily weighted with lead or other metal to enable the diver to sink and maintain his position under water.

Diving is practiced for the purpose of cleaning the hulls of ships, laying foundations under water and recovering property from wrecks.

**Diving Bell.** See DIVING.

**Divi'ning Rod**, a rod, usually of witch hazel, with two forked branches, used by persons who profess to discover minerals or water under ground. The rod, if carried slowly along by the

## Divorce

forked ends, dips and points downward, it is affirmed, when brought over the spot where the concealed mineral or water is to be found. The use of the divining rod is still common in many localities, but the wonderful discoveries attributed to it are not well authenticated, and many so-called discoveries have on further investigation proved wholly groundless.

**Division, *di vizh'un*, of Labor**, the separation of complicated processes into a series of simple operations, employed in all great industries for the simplification of the work to be done by each workman engaged. The principle results in a great saving of time, and much less ability is required on the part of the workman to acquire skill in performing only the particular operation for which he is chosen. Thus the cost of production is immensely reduced. Another great advantage arising from the division of labor is the inducement to the invention of machinery and the tendency to cause machinery to be more effectually used when invented. While it increases the skill and dexterity of individual workmen and conduces to the more economical distribution of labor by classing workmen according to their capacity, it leads to the deterioration in any one laborer's usefulness as an all-round workman.

**Divorce, *di vors'***, the dissolution of marriage by a competent legal authority. The significance of the term has of late been narrowed to include only the dissolution of the union from causes arising after marriage, the legal dissolution of a marriage which was void from the beginning being called *nullification*. The decree of divorce is now usually granted by the regularly organized courts, but the rite was formerly purely private, no legal ceremony being necessary. Gradually, with the improvement of religious and moral codes, the laws of divorce have become more stringent. Divorce is not recognized by the Catholic Church, and its priests are not authorized to remarry divorced persons. The same rule long held in England, until an act of Parliament in 1858. Since that time divorces are granted, but rarely, and for only the most important reasons. The divorce laws in the United States are regulated by the states and are widely divergent. One state, South Carolina, does not allow divorce, and the principles governing legislation vary from this strict rule to the greatest laxity. Among the causes for which divorces are granted are unfaithfulness, desertion, habitual drunkenness, cruelty, failure to support, gross immorality and incompati-

## Dix

bility. In some states divorced persons may remarry without restriction, but in others the rule varies from absolute prohibition of remarriage to some slight restrictions as to time. In the case of divorce, if the wife is blameless she is usually granted a certain specified sum for her support, called *alimony*.

Within recent years there has been a great increase in the proportion of divorces to marriages in the United States, in 1900 the ratio being one to fifteen. Consequently, there has been a growing movement in favor of stricter laws upon the subject. Some students of the problem demand the regulation of divorce by a national law; others, by agreement of uniformity among the states. See MARRIAGE; HUSBAND AND WIFE.

**Dix, DOROTHEA LYNDE** (1805-1887), an American philanthropist, who was born at Worcester, Mass., and died at Trenton, N. J. An inheritance enabled her about 1830 to give up school teaching and devote her life to philanthropy. Besides her work as a superintendent of hospital nurses in the Civil War, she did much, both in America and Europe, to relieve the harsh life of the inmates of public asylums, prisons and poorhouses. She caused the founding of more than thirty institutions for the insane, who were till her time regarded practically as a criminal class. Her books include many works on philanthropy, besides some children's volumes, such as *Alice and Ruth* and *Conversations about Common Things*.

**Dix, JOHN ADAMS** (1798-1879), an American statesman and soldier, born in Boscowen, N. H. He saw service in the War of 1812 and remained in the army until 1826, resigning his commission as captain to study law. He was admitted to the bar in 1828 and filled many local and state offices, becoming secretary of state of New York in 1833. He was United States senator in 1845 and secretary of the treasury in Buchanan's cabinet in 1861. It was in that capacity that he issued his famous order, "If any man attempts to haul down the American flag, shoot him on the spot." At the beginning of the Civil War he entered the army, becoming brigadier general and major general of volunteers. In 1866 he was appointed minister to Paris and in 1872 was elected governor of New York. He wrote several books.

**Dix, MORGAN** (1827-1908), an American clergyman, educated at Columbia University and the General Theological Seminary. In 1855 he became assistant minister of Trinity Church, New York, and seven years later he was made

## Dobbs Ferry

rector of the parish, holding the position until his death. Among his works are *A Commentary on the Epistle to the Romans*, *Lectures on the Two Estates*, and *Gospel and Philosophy*.

**Dixie** or **Dixie-land**, a term which came, by a popular error, to be identified with the South during the Civil War. It is derived from a Northern negro refrain, which was sung in New York about the beginning of the nineteenth century, and which expressed the supposed regrets of the slaves of a man Dixie, who had shipped his slaves to the South as the abolition sentiment grew stronger.

**Dixon, ILL.**, a city and the county-seat of Lee co., on the Rock River, 98 mi. w. of Chicago, on the Chicago & Northwestern and the Illinois Central railroads. The industries include piano, shoe, box, sash and blind and woven-wire factories, a planing mill and a condensed-milk factory. The town is in the center of a rich agricultural region. It was the base of supplies during the Black Hawk War. Dixon was first settled in 1836 by John Dixon. Population in 1910, 7216.

**Diz'ziness.** See VERTIGO.

**Dnieper, ne'pur**, a great river of Russia, which rises in the government of Smolensk, flows first southwest, then southeast and again southwest to the Black Sea. It has a total length, including windings, of 1330 miles. Among its tributaries are the Beresina, the Pripet, the Desna and the Psiol. In its lower course there are important fisheries. Between Kiev and Alexandrovsk it forms a series of cataracts, which are now being removed by blasting the rocks. It is navigable for nearly its entire length and is of great commercial importance.

**Dniester, nec'stur**, a large river of Europe, which has its source in the Carpathian Mountains in Austrian Galicia, enters Russia at Chotin and empties into the Black Sea, after a course of about 850 miles. Its navigation is difficult on account of frequent shallows and rapids, but its commercial importance has been increased by improvements made by the Russian government.

**Dobbs Ferry**, a village in Westchester co., N. Y., about 21 mi. n. of the center of New York City, on the Hudson River and on the New York Central & Hudson River railroad. It is the seat of residence of many wealthy New York merchants. Population in 1910, 3455.

It has an interesting history connected with the Revolutionary War. It was here in the old Livingston mansion that Washington and Rochambeau planned the Yorktown campaign.



## Dobson

In the same mansion Washington, Clinton and Carleton held a conference regarding the withdrawal of British troops from America in 1783, and opposite this point the first salute to the American flag by a British sloop-of-war was fired.

**Dobson**, HENRY AUSTIN (1840– ), an English critic and poet, born at Plymouth. He was educated in Coventry and Strassburg, with the expectation of being, like his father, a civil engineer. But in 1856 he went into business as a clerk of the Board of Trade and made that his vocation for forty-six years. But his avocation was writing verses, and in this field he accomplished some notable work, especially in the French style of *rondeau* and *ballade*.

**Dock**, a name applied to different large, herbaceous plants belonging to the rhubarb family. They have stout roots, alternate and often entire leaves, and bear panicles of small, greenish flowers. They are very troublesome as weeds, but the roots of some of them are used medicinally.

**Docks** are usually artificial enclosures for the reception of vessels, provided with gates to keep in or shut out the tide. They are called *wet docks* when they are intended to receive vessels for loading and unloading, the gates being in this case constructed so as to keep in the tide and thus to preserve the water within the docks as nearly as possible at the uniform level of high water. They are called *dry docks* or *graving docks* when they are intended to admit vessels to be examined and repaired, the gates in this case being such as to keep out the tide while the shipwrights are engaged on the vessel. There is another kind of dry docks, called *floating docks*, which float on the surface of the water and may be sunk sufficiently to allow of a vessel being floated into them, and then raised again, by having the tanks round the sides emptied of water. One of the chief uses of a wet dock is to keep a uniform level of water, so that the business of loading and unloading ships can be carried on without any interruption and without danger of damage to the vessel from straining, low tides or storms.

Dry docks are built of strong masonry, and their entrance is closed either by swinging gates, opening in the middle, or by a framework, called a *caisson*, built like the hull of a ship, with a keel and a stem at both ends. When the caisson is empty it floats and may be removed to admit of a vessel being floated into the dock. The caisson is then placed at the entrance and filled with

## Dodge

water, again sinks into the grooves intended for it and closes the dock. The water is then pumped out, leaving the ship dry and supported by wooden blocks and props. Floating docks are made of wood or steel and are constructed in sections, any number of which can be fastened together to make a basin large enough for the ship. The most important dry docks in the United States are at the government navy yards at Boston, Brooklyn, Philadelphia, Portsmouth, N. H., and Mare Island, San Francisco.

**Dock'yards**, yards supplied with all sorts of naval stores, materials and conveniences for the construction, repair and equipment of ships of war. In the United States the most important dockyards are found at Portland, Maine, Bristol, R. I., New London, Conn., Elizabeth, N. J., near Philadelphia, Wilmington, Del., and Baltimore, on the Atlantic coast, and at San Francisco and Port Orchard, near Seattle, Wash., on the Pacific coast. The dockyards on the Great Lakes are located at Buffalo, Cleveland, Toledo, Detroit, Port Huron, Milwaukee and Chicago. The most important European dockyards are at Glasgow.

**Doctrinaire'**, one who advocates theories of government rather than practical schemes: especially applied to a party of French politicians about 1815, represented by the Duke de Broglie, Royer-Collard, Guizot and others. They favored a constitutional monarchy, with a balance of power similar to that which then existed in Britain.

**Dod'der**, a peculiar parasitic plant, one species of which is found growing upon plants of the pea family almost everywhere. The plant starts from the ground, sends up long, twining, leafless, yellowish, thread-like stems which fasten themselves by rootlets to the plant and then break loose from the soil. The threads mat together and finally produce dense clusters of small white flowers. Dodder is a member of the convolvulus family.

**Dodge**, GRENVILLE MELLEN (1831– ), an American soldier and civil engineer, born in Danvers, Mass. He served with distinction in the Civil War, and in December, 1864, succeeded General Rosecrans in command of the Department of the Missouri. In 1866 he became chief engineer of the Union Pacific railroad, of which he was made a director. He served a term in Congress from Iowa, and in 1898 he was made president of the commission appointed to investigate the mismanagement of the Spanish-American War.



## Dodge

**Dodge, MARY ABIGAIL** (about 1830–1896), an American writer, more commonly known as Gail Hamilton. Her first literary work was done as editor of *Our Young Folks*, a Boston periodical. Among her writings which, though they have no great depth, are attractive by reason of their brilliance, are *Gala Days*, *Woman's Wrongs*, *The Battle of the Books* and *Sermons to the Clergy*.

**Dodge, MARY ELIZABETH MAPES** (1838–1905), an American writer and editor for children. After the death of her husband, William Dodge, she turned her attention to literary work, contributed to *Hearth and Home* and by 1873 had become the editor of *Saint Nicholas*. This magazine, under her management, became by far the best and most popular juvenile magazine in the United States. She has written much poetry for children, besides several stories, best known of which is *Hans Brinker; or the Silver Skates*.

**Dodge, WILLIAM EARL** (1804–1883), an American merchant and philanthropist, born at Hartford, Conn. He received a common school education, worked in his father's cotton mill and later removed to New York, where he became a clerk in a wholesale dry goods store and at the end of eight years entered business for himself. Later he became interested in railroad and insurance companies and in mines and lumbering. He accumulated a vast fortune, of which he gave liberally to the Young Men's Christian Association, the Freedmen's Bureau and the temperance and religious propaganda. In 1866 he was elected to Congress as a Republican, and later President Grant appointed him a member of the indian commission.

**Dodgson, doj'son, CHARLES LUTWIDGE** (1832–1898), an English divine, mathematical lecturer and author, educated at Christ's Church College, Oxford. He is most widely known, under the pseudonym of Lewis Carroll, as the author of *Alice's Adventures in Wonderland*, *Through the Looking-Glass* and several other children's classics. He also wrote *Mathematica Curiosa* and *Euclid and His Modern Rivals*.

**Do'do**, an extinct genus of birds, once abundant on the island of Mauritius and said by naturalists to be related to the pigeons. The dodo was a massive, clumsy bird, larger than a swan, and covered with down instead of feathers. It walked on short, ill-shaped legs and had wings and tail so short as to be useless for flight. Though the bird has been extinct for over two hundred years, there are

## Dog

perfect specimens in existence in the British Museum.

**Dodo'na**, a celebrated locality of ancient Greece, in Epirus, where was one of the most ancient Greek oracles. It was a seat of Zeus,



DODO

whose communications were announced to the priestesses in the rustling of the leaves on its oak tree and in the murmuring of water which gushed forth from the earth.

**Dog**, a common domestic animal of which there are several wild species, all related to the wolves, jackals and foxes. Wild dogs are found in southern Asia, in the islands of the Pacific, in Australia, where one species is known as the *dingo*, and in India, where the wild dog is called the *dhole*. The origin of the domestic dogs is a much-debated question, some people considering them derived from the wolf. All domestic dogs have several habits of the wolves and jackals, such, for instance, as digging up the earth with their fore feet and throwing it back with the hind feet, and turning around two or three times when about to lie down. The first use of the dog was for hunting, and as he was found teachable, affectionate and faithful, he grew to be man's chief friend among the lower animals.

There are about two hundred breeds of domestic dogs, which vary greatly in size, appearance and structure. Some have long, slender legs (for example, the greyhound); some have short, stout legs (for instance, the dachshund). Some have long, silky hair; some are almost hairless. Some have small, erect ears; others have long and tapcring ears. All have certain characteris-



tics which give them a place in man's affection second to no other domestic animal.

No entirely satisfactory classification of the different breeds of domestic dogs has been made, but the following will serve for general purposes. (1) *Wolf-like dogs*. This class includes dogs of a large size, with long hair and erect ears, resembling the wolf in general appearance (See **ESKIMO DOG**; **COLLIE**). (2) *Greyhounds*. Dogs of this class are slender, have fine, soft short hair and little power of scent. They are very fleet runners (See **GREYHOUND**). (3) *Spaniels*. This class is characterized by their long, hanging ears and curly coats. They all like the water and are used in hunting. (See **ST. BERNARD DOG**; **NEWFOUNDLAND DOG**; **SPANIEL**). (4) *Hounds*. Hounds are distinguished by their short hair, long noses and long, hanging ears, and by the keen scent which guides them in tracing game (See **BLOODHOUND**; **FOXHOUND**; **POINTER**; **SETTER**). (5) *Mastiffs*. These dogs have large heads and large, strong jaws (See **BULLDOG**). (6) *Terriers*. This is a distinct class, including many varieties, which differ widely from one another. They have short or long hair, the ears are erect and the bodies are usually light. See **TERRIER**; **SCOTCH TERRIER**; **DANDIE DINMONT**; **FOX TERRIER**; **SKYE TERRIER**.

**Dog'bane**, an American plant, found from Canada to Carolina. The whole plant has a milky juice, and the root is intensely bitter and nauseous. It is employed in America in the place of ipecac. Another species yields a useful fiber and is known as Canada, or indian, hemp.

**Dogcart**, a light pleasure cart, with two seats placed back to back. The cart derives its name from the box under the rear seat, which was originally used for carrying dogs.

**Dog Days**, the name applied by the ancients to a period of about forty days, the hottest season of the year, at the time of the rising of Sirius, the dog star. Though the star now rises at a different time, we still apply the term *dog days* to the hottest season of the year.

**Doge**, *doje*, the title of the first magistrate in the old Italian republics of Venice and Genoa. The first doge of Venice elected for life was Paolo Anafesto, in 697; and in Genoa, Simon Bocconera, in 1339. In the former city the dignity was always held for life; in the latter, in later times, only for two years. In both cities, the office was abolished by the French in 1797.

**Dog'fish**, a name given to several species of small shark, common around the British Isles,

so named from their habit of pursuing prey like dogs hunting. The rough skin of one of the species, the *lesser spotted dogfish*, is used in polishing various substances, particularly wood. This species is rarely three feet long. The *greater dogfish* is from three to five feet in length. It is blackish-brown in color, marked with numerous small dark spots. Both species are very voracious and destructive. Their flesh is hard, dry and unpalatable. The *common*, or *picked*, *dogfish* is common in North American seas and is sometimes used as food. On the Pacific coast oil is made from the livers of the dogfish.

**Dog'gerbank**, an extensive sand bank in the North Sea, about midway between the shores of England and Denmark, beginning about thirty-six miles east of Flamborough Head and extending in an easterly-northeasterly direction to within sixty miles of Jutland. In some places it is sixty miles wide. It is celebrated for its cod fisheries.

**Dog'ma**, an article of religious belief; one of the doctrines of the Christian faith. The history of dogmas, as a branch of theology, gives the origin and the changes of the various Christian systems of belief, showing what opinions were received by the various sects in different ages of Christianity, the sources of the different creeds, by what arguments they were attacked and supported, what degrees of importance were attached to them in different ages, the circumstances by which they were affected and the mode in which the dogmas were combined into systems. Lectures on this subject are common in the German universities.

**Dog Star**. See **SIRIUS**.

**Dog's-tooth Violet**, the common name for certain plants of the lily family. They are natives of the cooler temperate regions, and most of them belong to North America. Two smooth and usually mottled leaves spring from a scaly bulb. A single nodding yellow, purplish or white flower is borne from between the leaves on a short stem. It is one of the very pretty early spring flowers of the Northern states.

**Dog'watch**, a nautical term distinguishing two watches of two hours each (4 to 6 P. M. and 6 to 8 P. M.). All the other watches count four hours each, and if the dog watches were not introduced the same portion of the crew would always keep watch during the same hours.

**Dog'wood**. See **CORNEL**.

**Dol'drums**, among seamen, the parts of the ocean near the equator, that abound in calms, squalls and light baffling winds.

## Dole

**Dole**, NATHAN HASKELL (1852– ), an American author, born in Chelsea, Mass. He graduated at Harvard and taught in several academies before entering journalism. He was for a time literary and musical editor of the *Philadelphia Press*, and later he served with publishing houses. Among his original works are *The Building of the Organ*; *The Hawthorn Tree*, and *Other Poems*; *Omar, the Tentmaker—A Romance of Old Persia*, and some history and biography for young people. Dole has translated works from the Russian, Polish, German, Spanish, Italian, Swedish and Danish, including Halévy's *L'Abbe Constantin*, Daudet's *Tartarin de Tarascon*, books by Count Tolstoi and many songs. He has also edited many collections of prose and verse, including Tolstoi's works, a *Young Folks' Library* and a comprehensive variorum edition of *The Rubaiyat of Omar Khayyam*, containing parallel translations in many European languages.

**Dole**, SANFORD BALLARD (1844– ), a Hawaiian statesman, of American parentage, born in Honolulu. He graduated at Williams College (Mass.) and was admitted to the bar in Boston. Returning to Hawaii, he was made judge of the Supreme Court in 1887. After the revolution of 1893 he became president of the provisional government, and in the following year he was chosen president of the Hawaiian republic. Upon the conversion of Hawaii into a territory of the United States, he became its governor (1900), but, resigning in 1903, was appointed United States district judge of the territory. See HAWAII.

**Dol'lar**, a silver or gold coin, the unit of the monetary systems of the United States and Canada, with a value of 100 cents. It is equivalent to about 5.18 French francs, Italian lira or Spanish pesetas; .205 English pound sterling; 4.2 German marks; 3.73 Danish, Swedish and Norwegian crowns; 1.94 Russian rubles. The same name is given to different coins of almost the same weight but of half the value, which are current in Mexico, South America, Straits Settlements and the Philippine Islands. The name is derived from the Dutch *daler* or German *thaler*, but the coin used in the United States was patterned on "the Spanish milled dollar." The dollar was established as the monetary unit of the United States by an act of Congress under the Confederation in 1787, the decimal system of coinage having been established the year before. The first United States silver dollars were made in 1794. On March 14, 1900, an act was passed

## Dolomite

which made the gold dollar the standard in the United States, but no provision was made for coining it. Silver dollars have not been coined since 1905. See COINING; MONEY; also MONEY AND BANKING in Volume VI.

**Döllinger**, *döl'ling ur*, JOHANN JOSEPH IGNAZ VON (1799–1890), a celebrated German theologian and leader of the Old Catholic party, born at Bamberg, in Bavaria. In 1822 he entered the Church and soon after published *The Doctrine of the Eucharist during the First Three Centuries*, a work which won him the position of lecturer on church history at the University of Munich. He held this position, with the exception of 1847 to 1849, till 1871. In later years he took an active part in the political struggles of the time as representative of the university in the Bavarian Parliament, and, as delegate at the Diet of Frankfort he voted for the total separation of Church and State. After a visit to Rome he announced that the temporal sovereignty of the pope was not necessary for the progress and continuance of the Roman Catholic Church. He opposed the doctrine of infallibility of the pope and was excommunicated in 1871. He organized the Old Catholics in 1871 and worked for the union of Christian churches. The University of Munich celebrated his ninetieth birthday with festivities.

**Dol'liver**,\* JONATHAN PRENTISS (1858–1910), an American lawyer and statesman, born in Preston co., Va. He graduated from West Virginia University in 1875, was admitted to the bar three years later and began the practice of law in Iowa. He was elected to Congress continuously from 1889 to 1901, in the latter year was appointed United States senator for an unexpired term and was elected in 1902. In the Senate he became a leader of his party, being especially conspicuous as an advocate of Federal regulation of railroad rates.

**Dol'omite** or **Magnesian Limestone**, a rock and mineral, composed of carbonate of calcium and carbonate of magnesium and varying in color from gray or yellowish-white to yellowish-brown. It abounds in the Apennines, Tyrol, Switzerland, Tuscany and England. In the United States it occurs in western New England, eastern New York, Georgia and Tennessee. The finest varieties are known as marble (See MARBLE). A variety called *bitter spar*, and sometimes *rhomb spar*, is found in crystals having the form of a rhomboid. In color it is gray, yellow or reddish-brown, and it is semi-transparent. It is easily scratched with a



## Dolphin

knife. A second variety is called *pearl spar* and has crystals of curvilinear faces and of a pearly luster.

**Dolphin**, *dol'fin*, an animal which forms the type of a family that includes, also, the porpoise and the narwhal. It inhabits every sea from the equator to the poles. The common dolphin measures from six to ten feet in length and has a sharp snout about a half-foot long. It is usually black above, gray on the sides and white beneath. Its flesh is coarse, rank and disagreeable, but it is used by the Laplanders as food. The dolphins live on fish and mollusca, and often they may be seen in great numbers round shoals of herring. They have to come to the surface at short intervals to breathe. The structure of the ear renders the sense of hearing very acute, and the animals are observed to be attracted by regular or harmonious sounds. Compactness and strength are the characteristics of the genus, and they swim with extraordinary velocity. The dolphin is most common in the Mediterranean, but one species, the *bottle-nosed*, is caught on the coast of New Jersey. Other species which are taken off the coast of the United States are the *black dolphin* and the *spotted dolphin*. The name is also commonly but improperly given to a fish of the mackerel family, the beauty of whose colors when dying has been much celebrated by poets. In Greek mythology the dolphin was sacred to Apollo. Its image appeared on Greek coins and is said to have been represented on the shield of Ulysses.

**Dome**, a vaulted roof, in the shape of a hemisphere, or sometimes of an octagon or an ellipse, covering a building or part of it and forming a common feature of Byzantine and Renaissance architecture. *Cupola* is often used as a synonym, but, strictly speaking, the latter term refers to the interior, *dome* being applied to the exterior, though in common usage the entire structure is included under the name dome. The Byzantines first used the dome in their churches and made it a distinctive feature of their architecture. Prior to the time of the building of the Church of Saint Sophia in Constantinople, all domes were placed on circular supports, as there was no known way to make them fit on square walls, but in this great church the difficulty was solved (See PENDENTIVES). The Arabs copied the dome from the Byzantine models and used it extensively in their architecture, especially in their mausoleums and mosques, of which the Mosque of Omar in Jerusalem is one of the

## Dominic

earliest specimens. Most modern domes are semi-elliptical and are constructed of timber, but the ancient domes were nearly hemispherical and were constructed of stone. The finest, without any rival, ancient or modern, is that of the Rotunda or Pantheon at Rome, 140 feet in diameter and 143 feet in height, erected under Augustus and still in perfect condition. Among others the most noteworthy are Saint Peter's at Rome, 138 feet in diameter; Saint Paul's in London, 102 feet in diameter, and that of the Hotel des Invalides in Paris, 92 feet in diameter. The finest dome in the United States is that of the Capitol at Washington, measuring 96 feet in diameter.

**Domenichino**, *do ma'ne ke'no*, or **Domenico Zampieri** (1581-1641), an Italian painter of great eminence, belonging to the Bolognese school. He was born at Bologna and studied under Annibale Carracci, and afterward at Rome, where he became painter to Pope Gregory XV. His paintings are especially noted for their lifelike human figures. Among his best works are the *Communion of Saint Jerome*, in the Vatican Museum, considered by some almost the equal of Raphael's *Transfiguration*; the *History of Apollo*; the *Martyrdom of Saint Agnes*, and the *Triumph of David*.

**Domesday doomz'day**, **Book**, or **Doomsday Book**, a book containing a survey of the lands in England, compiled by the order of William the Conqueror, about 1086. The survey was made by commissioners, who collected the information in each district from a sworn jury consisting of sheriffs, lords of manors, presbyters, bailiffs, villeins—all the classes, in short, interested in the matter. The extent, tenure, value and proprietorship of the land in each district, the state of culture and in some cases the number of tenants, villeins and serfs were among the matters recorded. The survey was completed within a year. Northumberland, Durham, Cumberland and Westmoreland were not included in the survey, probably for the reason that William's authority was not then fully settled in those parts. The Domesday Book consists of two volumes, one folio and one quarto. It has been twice republished, the last time (1861-1865) in perfect facsimile.

**Domestic Science** See VOLUME V.

**Dom'nic**, SAINT (1170-1220), a famous Catholic churchman, a Spaniard by birth. He traveled as far as Denmark and spent the last six years of his life working for the order of the Dominicans, which he founded. He also

## Dominica

founded an asylum for women, which became an order of nuns, that he might keep them from the influence of the Albigenses. He and Saint Francis of Assisi were such close friends that their feasts are celebrated to-day by both the mendicant orders, Dominicans and Franciscans.

**Dominica**, *do me ne'kah*, a British West India island, a member of the united colony of the Leeward Islands, between Martinique and Guadeloupe. It covers an area of 291 square miles. It is rugged and mountainous, but it contains many fertile valleys and is well watered. The shores are but little indented and are entirely without harbors, but on the west side there are several good anchorages and bays. The principal exports consist of sugar, molasses, cocoa and lime juice. Roseau is the capital. The ownership of Dominica alternated between France and Great Britain until 1814. Population in 1911, 33,863.

**Domin'ical Letter** or **Sunday Letter**, in chronology, one of the seven letters of the alphabet, A B C D E F G, used in calendars to mark the first seven days of the year and all consecutive sets of seven days, to the end of the year, so that the letter for Sunday will always be the same. If the number of days in the year were divisible by seven without remainder, then the dominical letter year after year would be the same; but as it is, the year begins and ends on the same day, and therefore the dominical letters go backward one day each year. In leap years they go backward two days, so that the same series is not repeated till after four times seven, or twenty-eight years.

**Domin'ican Republic.** See SANTO DOMINGO.

**Domin'icans.** This order of preaching friars was founded in 1215 by Saint Dominic, who wished to increase the influence of the Church. He obtained confirmation for his order from Pope Honorius III in 1216, and this gave the friars the right to preach and to hear confessions everywhere. They are bound by the vows of chastity, poverty and obedience, are forbidden ever to eat meat, and they rise at midnight for prayer. They are missionaries at home and abroad and have always preached faithfully, but have been displaced in part by the Jesuits. They were known in France as Jacobins, in England as Black Friars, from the black cloak and hood which they wore. Four popes have been Dominicans. Among painters in the order were Fra Angelico and Bartolommeo. In

## Donahoe

theology were Thomas Aquinas and Albertus Magnus. The office of master of the sacred palace is hereditary in the order. A Franciscan always presided over the inquisition.

**Dominoes**, *dom'in oze*, a game played with small, flat, rectangular pieces of ivory, about twice as long as they are broad. Each piece is divided in the middle by a line, and each of the squares thus made is blank or marked by dots, from one to six or twelve in number. When one player leads by laying down a domino, the next must follow by placing alongside of it another, which has the same number of spots on one of its sides. Thus, if the first player lays down 6-4, the second may reply with 4-8, or 6-7; in the former case he must turn in the 4, placing it beside the 4 of the first domino, so that the numbers remaining out will be 6-8; in the latter case he must turn in the 6 to the 6 in like manner, leaving 4-7, to which his opponent must now respond. The player who cannot follow suit loses his turn, and the object of the game is to get rid of all the dominoes in hand, or to hold fewer spots than your opponent when the game is exhausted by neither being able to play. Other games with different styles of counting are played with dominoes.

**Domitian**, *do mish'e un*, (?-96), a Roman emperor, son of Vespasian and brother of Titus, whom he succeeded in 81. At first he ruled with a show of moderation and justice, but soon returned to the cruelty and excesses for which his youth had been notorious. He was at length assassinated.

**Don** (ancient Tanais), a river of Russia, which issues from Lake Ivan-Ozero, in the government of Tula, and flows southeast through the governments of Ryazan, Tambov, Voronej and Don Cossacks, to within 37 miles of the Volga, where it turns abruptly southwest for 236 miles and falls into the Sea of Azov. The length of the whole course is nearly 1150 miles. The chief tributaries are the Donetz and Voronej, on the right, and the Khoper and Manitsch, on the left. The Don carries a large traffic, especially during the spring floods, and a canal connects it with the Volga system of navigation. It has also very extensive and productive fisheries.

**Don'ahoe**, PATRICK (1811-1901), born in Munnery, Ireland, founder of the *Pilot*, the leading Catholic journal in the United States. He was prominent in charities and was one of the founders of the Boston Home for Destitute Catholic Children.



## Donatello

**Don'atel'lo** or **Donato**, *do nah'to*, (1386?-1466), an Italian sculptor, one of the most famous of the early Renaissance and one of the greatest of all time. He was born at Florence and was brought up in the home of Martelli, a wealthy relative. Early he became associated with Brunelleschi, the architect, from whom he gained much encouragement and help. In 1403 they went to Rome and studied together, but two years later Donatello was back in Florence. His first great works were *Saint Peter* and *Saint Mark*, in the Church of Saint Michael in Florence. In 1433 Donatello went to Rome again, and the works produced during his stay there show to a great extent the influence of classical art on his sculptures. The next year he returned to Florence and was employed by his friend and patron Cosimo de Medici, for whom he designed a beautiful bronze *David*, one of his finest works. In 1444 he went to Padua and there produced a bronze equestrian statue of Erasmo de Narni, called *Gattamelata*, which is his greatest work. After visiting Venice, Ferrara and other cities, he returned to Florence in 1457 and passed the rest of his life there. The distinguishing features of his art are realism and originality. He was the most revolutionary of artists, and though he closely followed antique models, his productions are not imitations, but are original and true to nature. His influence affected the sculpture of Florence throughout the fifteenth century, up to the time of Michelangelo.

**Donati's**, *do nah'teez*, **Comet**, so called from the Italian astronomer Donati, who first observed it, in June, 1858. Next to the comet of 1811 it is the most brilliant that has appeared this century. It was nearest the earth on Oct. 10, 1858.

**Don'gola**, a province of Upper Nubia, Egypt, on both sides of the Nile. It formerly belonged to Egypt and was the seat of a pasha, but since the evacuation of all the country south of Wada Halfa in 1886 by the Egyptian government it has been left in an unsettled state. Its chief products are dates, cotton, indigo and maize. The population is a mixture of Arabians and indigenous Nubians. The chief town is Dongola, or El Ordeh, on the left bank of the Nile. Population, 6000.

**Doniphan**, *don'i fan*, ALEXANDER WILLIAM (1808-1887), an American lawyer and soldier, born in Mason County, Ky. He graduated at Augusta College in 1824, was admitted to the bar in 1830 and began to practice in Lexington, Mo. For several terms he served in the state

## Donnelly

legislature. He was made colonel of a regiment of mounted veterans, equipped for the army of the West at the beginning of the Mexican War, and he did good service. Before the Civil War he was a commissioner from Missouri to the Peace Convention in Washington, which endeavored to avert the war.

**Do'nizet'ti**, GAETANO (1797-1848), a famous Italian composer. In 1835 he produced the operas *Lucia di Lammermoor* and *Lucrezia Borgia*, both emphatically successful, the first of which was probably his most famous work and is still considered his masterpiece. In the same year he removed to Paris, where he wrote and produced several operas, *Les Martyrs*, *La Favorita*, *La Traviata*, *Don Pasquale* and *La Fille du Regiment*, all of which are still popular. The famous sextette from *Lucia* is one of the most beautiful passages ever written.

**Don Juan**, *don hwa'n*, the hero of a Spanish legend, which seems to have had some historical basis in the life of a member of the noble family of Tenorio at Seville. According to the legend, Don Juan was recklessly immoral. An insult to the daughter of a governor of Seville brought the indignant father and the profligate don into deadly conflict, in which the former was slain. Don Juan afterward, in a spirit of wild mockery, went to the grave of the murdered man and invited his statue to a revel. To the terror of Don Juan, the "stony guest" actually appeared at the table to bear him away to hell. The legend has furnished the subject for many dramas, among them Molière's *Don Juan* and Shadwell's *The Libertine*, and for many operas, the most famous of which is Mozart's *Don Giovanni*. The *Don Juan* of Byron bears no relation to the old story, except in the character of the hero.

**Don'key**, the name given to the ass when domesticated. See ASS.

**Don'nelly**, IGNATIUS (1831-1901), an American journalist and politician. He studied law, was admitted to the bar and in 1856 went to Minnesota, where he was three years later elected lieutenant governor. From 1863 to 1869 he was in the House of Representatives, for many years he was in the state legislature and twice he was nominated for vice-president of the United States by the People's party. Among his writings the one which attracted most attention was *The Great Cryptogram*, which attempted to prove, by means of a word-cipher, that Bacon wrote Shakespeare's plays.

## Don Quixote

**Don Quix'ote** (Spanish *ke ho'ta*), the title of a famous romance by Cervantes. See CERVANTES SAAVEDRA, MIGUEL DE.

**Doo'ley**, MR. See DUNNE, FINLEY PETER.

**Do'ra D'Istria**, *de'stre ah*, (1828-1888), the pen name of Helen Ghika, a Rumanian writer. She attempted at fifteen a translation of the *Iliad* into German, and this was followed by several dramatic writings. Her first work of note was *Monastic Life in the Eastern Church*, and this was followed by *German Switzerland* and *Women in the East*. Her *Pilgrimage to the Tomb of Dante* contains an account of the sixth centenary festival in honor of Dante's birthday. She wrote various other works on Switzerland, Venice and Rumania.

**Dordrecht**, *dor'dreKt*, or **Dort**, a town of the Netherlands, in the province of South Holland, 14 mi. n. e. of Rotterdam, on an island separated from the mainland by an inundation in 1421. It was formerly of more importance than now, but it still carries on an extensive trade. It has shipbuilding docks, sugar refineries, sawmills and manufactures of tobacco and white lead. It was here that the Synod of Dort met in 1618 and condemned the doctrines of Arminius. Population in 1910, 46,862.

**Doré**, *do ra'*, PAUL GUSTAVE (1833-1883), a prolific French draftsman and painter, born at Strassburg. He distinguished himself greatly as an illustrator of books. His illustrations of Rabelais, of Perrault's *Tales*, Sue's *Wandering Jew*, Dante's *Divina Commedia* and Cervantes's *Don Quixote* displayed great fertility of invention and acquired for him a European reputation. Doré's pictures are especially interesting because of the wonderful imaginative power and dramatic sentiment revealed in them. His use of landscape is often very effective in portraying certain gloomy and weird scenes. *Christ's Entry into Jerusalem* and *Paul and Francesca da Rimini* are among Doré's best-known pictures, but his illustrations of the Bible are probably the most widely known of his works.

**Dore'mus**, MRS. SARAH PLATT (HAINES) (1802-1877), an American philanthropist, born in New York City. She inherited a large fortune and early began to devote it to philanthropic enterprises, founding numerous homes and hospitals, especially for women. Among these were the Isaac T. Hopper Home for women discharged from prison, the New York Women's Hospital, and the House and School of Industry for poor women. She also established,

## Dorr

in 1860, the Women's Union Missionary Society, and during the war she was conspicuous in the service of wounded soldiers.

**Do'rians**, one of the four great branches of the Greek nation. They migrated from Thessaly southward in the twelfth or eleventh century B. C., settling for a time in the mountainous district of Doris, in Northern Greece, and finally in Peloponnesus.

**Dor'ic Order**. See COLUMN.

**Do'rion**, ANTOINE, Sir (1818-1891), a Canadian lawyer and politician, born at Saint Ann de la Perade, educated at Nicolet College and admitted to the bar in 1842. He was elected to the Canadian assembly and from 1867 to 1874 was a member of the Dominion Parliament, where he led the French-Canadian Liberal party, known as the *Rouge*. He also held important positions in the ministry, and in 1874 he became chief justice of the province of Quebec. He was knighted by Queen Victoria in 1877.

**Dor'mer Window**, a window set in the gable of a sloping roof, the frame being nearly vertical to the rafters. It was an important feature in early Gothic architecture and in the later Renaissance. See GABLE.

**Dor'mouse**, a small rodent, common in Europe, resembling the squirrel in its habits



DORMOUSE

and in its hairy tail. These little animals inhabit temperate and warm countries and subsist entirely on vegetable food. Their pace is a kind of leap, but they have not the activity of squirrels. While feeding, they sit upright and carry the food to the mouth with their paws. The dormice pass the winter in a torpid state, reviving only for a short time on a warm, sunny day, when they take a little of their hoarded stores and then relapse into sleep. Among the different species are the *fat dormouse* and the *garden dormouse*.

**Dorr**, THOMAS (1805-1854), an American politician, the leader of Dorris Rebellion in Rhode Island. He was born at Providence, R. I., and was educated at Harvard College.



## Dortmund

He was a member of the Rhode Island legislature, 1833-1837, and there headed a party for extending the suffrage, which was still restricted, according to the old charter, by a property qualification. Two constitutions were placed before the people for adoption, and that embodying Dorr's reform received a majority of votes, but it was declared illegally adopted. Dorr was also elected governor, and his followers attempted to sustain their government by force of arms. The attempt failed, Dorr was convicted of treason and was sentenced to imprisonment for life, but was afterwards pardoned.

**Dortmund**, a city of Prussia, in the province of Westphalia, situated on the Emster, 73 mi. n. e. of Cologne. It has four churches, which are its most noteworthy structures. Dortmund has rapidly increased in population in recent years, its prosperity being due to its situation upon several important railway systems, to the opening of extensive coal mines in the vicinity and to the active manufacture of iron, steel and machinery. There are also a number of breweries, potteries, tobacco factories and chemical works. Dortmund was once a free imperial Hanseatic town and was the seat of the chief tribunal of the Vehme. Population in 1910, 214,333.

**Douai**, *doo a'*, **Bible**, the English translation of the Bible used among English-speaking Catholics and executed by divines connected with the English College at Douai. The New Testament was published in 1582 at Rheims; the Old, in 1609, at Douai. The translation is made from the Vulgate, or Latin version, which, according to a decree of the Council of Trent, was made the standard Bible of the Roman Church. Protestant versions have changed it.

**Double Stars**, a pair of stars revolving about a common center. It is thought probable that wherever two stars appear very close together in the heavens, they revolve about each other. Sometimes a revolution requires centuries, sometimes it requires thousands of years; so that it is difficult to prove the phenomenon in any particular case. In some of these systems of double stars, the colors are beautifully contrasted, the larger one being orange or red, and the smaller showing its complement, blue or green. See **ALGOL**.

**Douglas**, *dug'las*, the capital of the Isle of Man, a popular watering place. It is frequented by immense numbers of visitors during the summer. Among the objects of interest

## Douglas

are the House of Keys, the customhouse, the extensive breakwater, the promenade and the tower of refuge, built in 1833 for the safety of shipwrecked mariners. Population, 23,000.

**Douglas**, **STEPHEN ARNOLD** (1813-1861), an eminent American statesman and politician, born in Brandon, Vt. During early life he worked on a farm and taught a country school; then he moved to Illinois, where he was admitted to the bar at Jacksonville. Within a year from



STEPHEN A. DOUGLAS

this time he was elected prosecuting attorney for his district and rapidly rose in his profession. He was elected to the lower house of the state legislature in 1836, and in 1841 he was appointed secretary of state for Illinois, but resigned to become judge of the supreme court. Two years later he entered the national House of Representatives, and in 1847 he was chosen United States senator, which position he filled until his death. In Congress and before the people, Douglas attained a high reputation as an orator and, being of slight stature, was popularly known as the "Little Giant." He became a leader of the Democratic party, favoring the annexation of Texas, the Mexican War and most of the measures looking toward the extension of slavery. He opposed the Wilmot Proviso but upheld the compromise of 1850.

As an advocate of slavery he was careful not



## Douglas

to alienate the people of either the North or the South, since it was his ambition to become president of the United States. He therefore introduced into Congress the doctrine known as "popular" or "squatter" sovereignty, which held that to the citizens of each territory belonged the right to determine, through their representatives, whether slavery should be admitted to that territory, but that meanwhile slavery should be allowed. Douglas was therefore the most conspicuous supporter of the Kansas-Nebraska Bill, which applied the doctrine of squatter sovereignty to the territory of Nebraska, which then included Kansas, Nebraska, the Dakotas, Montana and parts of Wyoming and Colorado. No single event of the period before the Civil War had greater influence in arousing anti-slavery agitation than this law. In 1858 Douglas was opposed in his campaign for reelection by Abraham Lincoln, who had risen to prominence in Illinois. During this campaign occurred the famous debates between Lincoln and Douglas, in which the whole problem of slavery and its extension was discussed with remarkable ability by both candidates. Though Douglas was successful, his infirm position upon the slavery question cost him the support of the southern wing of his party in his campaign for the presidency in 1860. Though nominated by the Northern Democrats, he received only twelve electoral votes, those of Missouri and part of New Jersey. However, he received a popular vote second only to that of Lincoln. When the Civil War broke out, and the issue was between union and secession, he was a strong supporter of President Lincoln, but died a few months after the beginning of the struggle. See KANSAS-NEBRASKA BILL; SQUATTER SOVEREIGNTY.

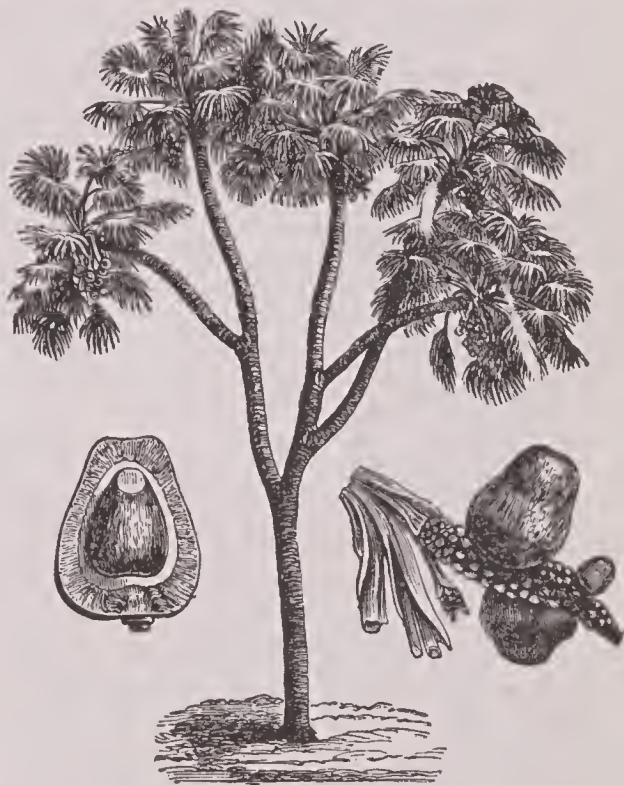
**Douglas, WILLIAM LEWIS** (1845- ), an American capitalist, manufacturer and politician, born at Plymouth, Mass. From early childhood he worked in shoe and cotton factories, and finally in 1876 he settled at Brockton, Mass., where he opened a small shoe shop, from which one of the largest shoe factories in the world has grown. He served several terms in the state legislature, was mayor of his city in 1891 and in 1904 was elected governor of Massachusetts as a Democrat, but declined a second nomination.

**Douglass, FREDERICK** (1817-1895), an American lecturer and journalist, son of a negro slave, born at Tuckahoe, in Maryland. Although his father was a white man, he was, according to the law, reared as a slave. In 1832 he was

## Dove

purchased by a Baltimore shipbuilder, but made his escape in 1838. As he had taught himself to read and write and showed talent as an orator, he was employed by the anti-slavery society as one of its lecturers, and he also published several anti-slavery papers. In 1845 he published his autobiography, and afterward he made a successful lecturing tour in England. After the war he started a journal entitled *The New National Era*. Douglass was appointed secretary of the commission to Santo Domingo in 1871, presidential elector for New York in 1872, later marshal for the District of Columbia, recorder of deeds for that district and United States minister to Hayti.

**Doum Palm**, *doom'palm*, a palm tree, remarkable for having a repeatedly-branched



DOUM PALM

stem. Each branch terminates in a tuft of large, fan-shaped leaves. The fruit is about the size of an apple. It has a fibrous, mealy rind, which tastes like gingerbread and is eaten by the poorer inhabitants of Upper Egypt, where the doum palm grows.

**Douro**, *do'e ro*. See DUERO.

**Dove**, *duv*, a name which scientifically has no distinction from pigeon, but which is commonly applied to a few species of pigeons only (See TURTLE DOVE). In poetry and in legend the dove has always been the symbol of innocence, gentleness and love, and in the Christian religion it has occupied a prominent position.



It was a dove that Noah sent from the ark; a dove rested on the head of Christ after his baptism, and Saint John "saw the Spirit descending from heaven like a dove." The dove appears in innumerable pictures throughout all periods of Christian art.

**Do'ver**, DEL., the capital of the state and the county seat of Kent co., 48 mi. s. of Wilmington, on Jones Creek and on the Philadelphia, Wilmington & Baltimore railroad. The town is in a fruit region and contains fruit-canning and evaporating works, sawmills, foundries and machine shops. Wilmington Conference Academy and an agricultural and manual training school for colored students are located here. The statehouse, the county courthouse and the postoffice are important buildings. Dover was settled in 1717. It was made the capital in 1777 and was incorporated as a town in 1829. Population in 1910, 3720.

**Dover**, a borough of England, in the county of Kent, 67 mi. s. e. of London. It lies on the coast of the Strait of Dover and is 21 miles distant from Calais, on the French coast. It is an important railway terminus, and as a port for mail and packet service with the continent it has a large passenger traffic. Ship-building, sailmaking and fisheries are the chief industries. The harbor has been much improved in recent years. The entrance is protected by the Admiralty Pier, which is nearly half a mile in length. The celebrated castle of Dover stands on a chalk cliff 350 feet in height. Population in 1911, 43,600.

**Dover**, N. H., the county-seat of Strafford co., 10 mi. n. w. of Portsmouth, on the Coheco River and on branches of the Boston & Maine railroad. The river furnishes water power for the manufactures, which include machinery, cotton and woolen goods, lumber products, brick, hats and shoes. The city has a public library, a fine townhall, an opera house, Saint Joseph's Hill School and Franklin Academy. The place was settled in 1623 and is the oldest town in the state. It received its present name in 1639. As a frontier settlement during the seventeenth century, it suffered greatly from indian attacks. Population in 1910, 13,247.

**Dover**, N. J., a town in Morris co., 28 mi. w. of Newark, on the Rockaway River, the Morris Canal and on the Lackawanna and the New Jersey Central railroads. Its industries include railroad shops, rolling mills, furnaces and machine shops and manufactures of silk and knit goods. Close by are several well-

known summer resorts and a national powder depot. Dover was settled in the middle of the eighteenth century. Population in 1910, 7468.

**Dover**, STRAIT OF, the narrow channel between Dover and Calais, which separates Great Britain from the French coast. At the narrowest part it is only 21 miles wide. The depth of the channel at a medium in the highest spring tides is about 25 fathoms. On both the French and English sides are chalk cliffs, which show a correspondency of strata.

**Dow** or **Dou**, GERARD (1613-1675), an eminent painter of the Dutch school, was born at Leyden. He studied under Rembrandt and united his master's manner in handling light and shade with the most minute finish and delicacy. His first work consisted chiefly of portraits, but later he gave his attention to genre painting and soon excelled in scenes of domestic and common life, which he depicted in a tender and charming style. The chief fault of his work is excess of unimportant details. The best specimens of his art are *Woman Sick of the Dropsy*, *The Bible Reader* and *Grocer Woman*.

**Dow**, NEAL (1804-1897), an American temperance reformer, born in Portland, Me., of Quaker parentage. He served twice as mayor of Portland, one term as assemblyman and enlisted in the Union army during the Civil War. He was promoted to be brigadier general. After the war he devoted himself to the temperance cause and was the candidate of the national Prohibition party for president in 1880. He lectured in all parts of the United States, Canada and Great Britain with great success.

**Dowden**, EDWARD (1843-1913), an English critic and scholar, born in Cork, Ireland, and educated at Trinity College, Dublin. He held successively the positions of professor of oratory and professor of English literature in Trinity College. His *Shakspere: His Mind and Art*, *Shakspere Primer*, *Introduction to Shakspere*, with editions of the *Sonnets* and of *Hamlet* and *Romeo and Juliet*, placed him among the foremost Shakespearean scholars. He also wrote, among other things, excellent critical works on Shelley and Wordsworth and a history of French literature.

**Dow'el**, a pin of wood or iron used to hold together boards, stones or other parts of a structure. The parts so fastened are said to be doweled, and a joint containing dowels is called a dowel joint.

**Dowie**, JOHN ALEXANDER (1847-1907), an American religious leader and faith healer, born

## Downing

at Edinburgh, Scotland. He was admitted to the ministry and was pastor of two churches in Sydney, Australia, but later devoted himself to evangelism, traveling in England and America. He finally settled in Chicago in 1890 and soon afterward organized the Christian Catholic Church, with headquarters at Zion, about 35 miles north of Chicago. There he established a publishing house, a bank, a college, many charitable institutions, candy and lace factories and other industries, over all of which, as well as the conduct of his followers, he was dictator. In 1903 a tabernacle was erected at Zion, said to be one of the largest churches in the world. In 1901 Dowie announced himself to be Elijah the Restorer and made plans to extend the influence of Zion's church throughout the world. In 1906, however, a revolt among his followers led to his deposal from the position of authority and leadership.

**Down'ing**, ANDREW JACKSON (1815-1852), an American landscape gardener and nurseryman, born at Newburgh, N. Y. He laid out the grounds about the National Capitol, the White House and the Smithsonian Institution at Washington, D. C. His influence on American horticultural progress was very great. Among his contributions to the literature on horticulture are *Fruits and Fruit Trees of America*, *Treatise on the Theory and Practice of Landscape Gardening* and many essays.

**Doyle**, ARTHUR CONAN, Sir (1859- ), an English novelist. He studied at Stonyhurst and Edinburgh, and from 1882 to 1890 he practiced medicine at Southsea. The success of some early attempts at fiction led him to give up his profession for a literary career, and he has written a great number of very popular books. In 1887 appeared *A Study in Scarlet*, made famous at once by the detective Sherlock Holmes, whom he introduced also into *The Sign of the Four*, *The Adventures of Sherlock Holmes*, *The Memoirs of Sherlock Holmes* and *The Hound of the Baskervilles*. Among his other books are the historical novels *Micah Clarke* and *The White Company*; the volumes of short stories *Round the Red Lamp* and *The Stark Munro Letters*, and *The Great Boer War*. He was knighted in 1902, as a reward for his services during that war and for his defense of the British policy.

**Drachma**, *drak'ma*, a unit of weight and of money among the ancient Greeks; also, the name of their principal coin, made of silver and worth about 19 cents. As a unit of weight it varied from 56 to 97 grains troy. The same

## Drafting

name is given to a modern Greek coin, exactly equal to the French franc and, approximately, to 19 cents. It is divided into 100 *lepta*. The *drachma*, *dram* or *draehm* is the unit of weight in Greece, being exactly equal to the metric *gram*. The same term is applied to a unit of apothecaries' weight, equal to 3 scruples, or 60 grains.

**Dra'co**, an Athenian statesman who flourished about 624 B. C. When the citizens of Athens became dissatisfied because they had no written laws to which they could appeal against unjust judgments, Draco was appointed to draw up such a code. These first written laws were so merciless that they were said to have been written in blood. Almost every offense was punishable



CONAN DOYLE

by death. The laws of Draco were replaced later by the constitution of Solon. See SOLON.

**Draft'ing** or **Conscrip'tion**, the common name given to the enlisting of men in an army under compulsion. It was first used in Rome, a certain number of men being added to the army each year by conscription. In most European countries every man who is physically capable is compelled to serve for a time in the army. During the Civil War the Northern government was compelled several times to gain recruits by conscription, the most important act for that purpose being passed in March, 1863, and resulting in serious riots in New York City, which were only put down by firm and prompt action on the part of the state and Federal governments. The



## Dragon

system was also used in the South during the Civil War.

**Drag'on**, a name for several species of lizards inhabiting Asia, Africa and South America. The common *flying lizard*, the best type of the genus, is about ten or twelve inches in length, the tail being extremely long in proportion to the body. The sides of the animal are furnished with peculiar extensions of the skin, which form a kind of wings and help to support the dragon in the air when it springs from branch to branch. Its food consists almost exclusively of insects.

Dragons, in mythology, were fierce, winged beasts like huge lizards, breathing fire and preying on human beings.

**Drag'onet**, the name of a family of small fishes, inhabiting the shores of warm seas. They have rather long, scaly bodies and are peculiar in having the gill openings reduced to a small hole on each side of the nape. The male and female are very different in color. In some species the males have the fins produced into spines and connecting membranes, which are highly colored. There are several species known, among which are one in Great Britain and one in the waters of Japan.

**Dragon Fly**, a family of beautiful insects, with large, long, gauze-like wings, that give it



DRAGON FLY

powerful and rapid flight. The dragon fly lays its eggs in the water, where the larvae and pupae live on aquatic insects. The larval stage lasts for a year. The pupae are always hungry. They propel themselves through the water by drawing it into their bodies and throwing it out again. In the United States the dragon fly is known as the *devil's darning needle*, and is the subject of some childish superstitions, but the dragon flies are harmless insects, and not even the butterflies can eclipse them in beauty of color or gracefulness of motion.

**Dragon Tree**, a rare, tree-like plant of the lily family, with a stem simple or divided at the

## Drainage

top and in old age often much branched. The trunk is very thick in proportion to its height. One famous tree at Teneriffe was seventy feet high and forty-five feet in circumference. When Humboldt saw the tree it was hollowed out and used by the natives as a sanctuary. The dragon tree is a native of the Canaries and yields a resin known as dragon's blood, though the dragon's blood of commerce comes principally from other trees.

**Drain'age**, a method of withdrawing the water from the soil by means of channels, which are generally covered. Wet lands are made more productive, swamps and marshes are reclaimed and unhealthful surroundings are made sanitary by drainage. Successful drainage in a great measure depends on a proper knowledge of the situation and the porosity and character of the various strata of the soil. Some strata allow water to pass through them, while others force it to run or filtrate along their surfaces till it reaches a lower level. In general, where the grounds are in a great measure flat and the soils retain the excess of moisture, they require artificial drainage to render them capable of yielding good crops, whether of grain or grass. The wetness of land, which makes it inferior for agricultural purposes, may appear not only as surface water, but as water which flows through the lower strata, and in consequence both surface-draining and under-draining are at times necessary. Open ditches carry off the surface water, but they also carry off much of the best soil, so they are not generally used where other methods are available. Stone or tile drains lying four or five feet below the surface are the best medium for agricultural lands. Stone drains are either formed on the plan of open culverts of various forms, or of small stones in sufficient quantity to permit a free and speedy filtration of the water through them. The box drain, for instance, is formed of flat stones neatly arranged in the bottom of the trench, the whole forming an open tube. In tile drains, tiles or pipes of burnt clay form the conduits. They possess all the qualities which are required in the formation of drains, affording a free ingress to water, while they effectually exclude vermin, earth and other injurious substances. Drainage tiles and pipes have been made in a great variety of forms, the earliest of which, since the introduction of thorough draining, was the horseshoe tile, so called from its shape. These should always rest on soles, or flats, of burned clay. Pipe tiles, which combine the sole and cover in one piece, have been

## Drainage Canal

made of various shapes, but the best form appears to be the cylinder.

Sometimes, by placing a few simple drains in the proper places near the sources of springs, swamps of great extent may be quickly dried, while surface drainage of the swamp would be very expensive and only partly successful. In many states of the United States laws provide for the reclamation of swamp land, partly at the expense of the county in which they are located. In the laying out of drains, the first point to be determined is the place of outfall, which must necessarily be at the lowest point of the land to be drained. The next point to be determined is the position of the minor drains. In the laying out of these, the surface of each field must be regarded as being made up of one or more planes, for each of which the drains should be laid out separately, so that they will run in the line of the greatest slope, no matter how distorted the surface of the field may be. All the minor drains should be made to discharge into mains or submains, and not directly into an open ditch or water course. As a general rule, there should be a main to receive the waters of the minor drains from every five acres.

**Drainage Canal**, CHICAGO, a canal connecting the south branch of the Chicago River with the Desplaines River at Lockport, Ill. This canal was begun September 3, 1892, and was completed in January, 1900. It is a little over 28 miles long and from 30 to 36 feet deep; its width at the bottom in rock sections is 150 feet, and in earth sections from 110 to 202 feet, and at the top it is from 200 to 300 feet wide. The depth of water is never less than 22 feet, and the average flow is 300,000 cubic feet a minute, though its capacity is 600,000 cubic feet. The controlling works at Lockport consist of flood gates, a beartrap dam and a tail-race 6500 feet long.

The Chicago Drainage Canal was constructed for the purpose of turning the sewage of Chicago into the Illinois River. Previous to its construction the sewage had flowed into Lake Michigan, from which the city obtains its water supply. It is considered one of the greatest engineering feats of the century. By its construction the Chicago River, which flowed into Lake Michigan, had its direction reversed, and a powerful current from the lake was sent through its channel to the Illinois River and thence to the Mississippi. The channel is large enough to carry boats drawing 22 feet of water, and with

## Drake

the necessary improvements in the Illinois and Mississippi rivers, the canal will serve the double purpose of drainage and transportation.

**Drainage Tubes** are used in surgery to conduct pus or matter away from an abscess when a free incision cannot be safely or conveniently made. They are usually made of india rubber or caoutchouc and are introduced into the abscess or wound so that one end is in contact with the seat of discharge, while the other reaches to the surface of the skin.

**Drake**, FRANCIS, Sir (1540–1596), an English navigator, born in Devonshire. He served as a sailor in a coasting vessel and afterward joined Sir John Hawkins in his last expedition against the Spaniards (1567), losing nearly all he possessed in that unfortunate enterprise. On the most famous of his voyages Drake passed the Straits of Magellan, plundered the coasts of Chile and Peru, sacked several ports and captured a Spanish galleon laden with silver, gold and jewels to the value of perhaps \$1,000,000. He then ran north, seeking a passage to the Atlantic, but was compelled to abandon this scheme. He then steered for the Moluccas, crossed the Indian Ocean, doubled the Cape of Good Hope and arrived at Plymouth, Nov. 3, 1580, being the first Englishman to circumnavigate the globe.

**Drake**, *drah'ke*, FRIEDRICH JOHANN HEINRICH (1805–1882), a celebrated German sculptor, born at Pymont. At a very early age he showed an inclination for art, and through a friend he gained admission to the studio of the sculptor Rauch, whose influence is shown in almost all of Drake's works. His most important work, a colossal bronze statue of King William of Prussia, which was made for the iron bridge of Cologne and was exhibited at the Paris Exposition of 1867, is generally regarded as one of the greatest works of modern sculpture. Among his earlier works worthy of mention are *A Dying Warrior*, *A Madonna and Child*, *A Warrior Crowned by Victory* and *A Female Vine-Dresser*. He also executed some important busts and statuettes, which include those of Goethe, Schiller, Humboldt and Rauch.

**Drake**, *drake*, JOSEPH RODMAN (1795–1820), an American poet. His youth in New York was a hard struggle, but he managed to take a course in medicine and graduated in 1816. In the same year he married a young woman with money, and two years later he went with her to Europe. Returning to the United States, he went to New Orleans for his health, but received no help and died of consumption in



1820. In his literary work he was closely connected with Fitz-Greene Halleck, who wrote a eulogy on him. His best remembered poems are the ode to *The American Flag*, and *The Culprit Fay*, which was popular in its time.

**Drakensberg**, *drah'kens berg*, a range of mountains in South Africa, forming the western frontier of Natal. The highest peak has been estimated at 12,000 feet. Many battles were fought in this region during the wars between the Boers and the English.

**Dra'ma** (from the Greek word meaning *action*), a prose or poetic work, usually intended to be acted on the stage, in which, by conversation, action and set scenery, incidents and characters are presented in a striking manner. Its two great branches are tragedy and comedy, the former, roughly speaking, melancholy in character, the latter cheerful. The origin of the drama must be sought for in the love of imitation, and dramatic performances of some kind are to be met with probably among all nations. Dramatic compositions are found in the Old Testament, for example, in Job and the Song of Solomon; and ancient India and China both developed a dramatic literature of their own.

The European drama had its origin in Greece, and here both forms, tragedy and comedy, took their rise in the celebrations of the festivals of Bacchus. At these festivals, hymns and chants, either sorrowful or gay in tone, were sung by choruses in honor of the gods, and the chorus continued to be a prominent feature of the old Greek drama. A distinguishing mark of the Greek drama was its adherence to what was known as the unities of time, of place and of action. That is, the events of the play must not extend over more than one day; any change of scene must be slight, no more than what could actually be accomplished in the length of time represented, and all the incidents must bear closely on the one central plot. Modern dramatists have, as a rule, in order to increase the possibilities of their art, neglected the unities of time and place; and the introduction of a stage curtain and of elaborate scenery, unknown to the Greeks, has made possible a freedom unknown to the primitive theater. Even in regard to the unity of action, still recognized as important, much greater latitude is now allowed, and secondary plots are often introduced. The invention of tragedy is generally ascribed to Thespis (about 550 B. C.); but the true creator of tragedy was Aeschylus. Thespis

had only one actor, who from time to time relieved the chorus by declamation; Aeschylus changed this representation into real action by making use of two actors in addition to the chorus. He also introduced masks; and by means of a long gown and the *cothurnus*, or buskin, the lofty stature of the heroes was imitated. A third actor was first introduced by Sophocles. Other changes also took place. The chorus, fifty in number, was divided into four groups, and plays were presented in groups of four, founded upon some one legend. Greek tragedy, at the time of its chief representatives, Aeschylus, Sophocles and Euripides, was rather a religious function than an entertainment. Not only moral, but religious, purposes were evident, and a fear of the justice of the gods was taught by the presentation of the punishment which followed an evil action. Comedy developed side by side with tragedy, but it never attained an equal importance. Largely political in its origin, it held up to ridicule the most prominent men of the day; and from this phase it passed to the ridicule of the foibles of humanity as a whole. The chorus was dropped from the comedy early in its history. The most important name in connection with Greek comedy is Aristophanes.

The regular drama among the Romans was borrowed from the Greeks. Plautus and Terence were imitators of the Greek comedy, and it is from their translations, rather than from the originals, that we are acquainted with the work of the later Greek writers of comedy. The most important remains of Roman tragedy are the ten dramas accredited to Seneca, which were intended for reading rather than for acting.

In most modern European countries the regular drama took its rise in the mysteries, miracle plays and moralities of the Middle Ages (See MYSTERIES). In Italy, however, it began with a reproduction in Latin of classical models. The earliest tragedy in Italian is Trissino's *Sofonisba* (1515). Regular comedies in Italian were written by Ariosto, Aretino, Macchiavelli and others; and to the same period (fifteenth and sixteenth centuries) belongs the Italian pastoral drama, which sprang from the ancient idylls and aimed at a fanciful delineation of Arcadian and mythological scenes. Among the pastoral dramatists of this period are Poliziano, Tasso and Guarini. The pastorals gave birth to the opera, early masters of which, so far as it may be included in the poetic drama, are Zeno and Metastasio. The Italian drama

waned in the seventeenth century, but in the eighteenth century genuine comedy and classic tragedy were restored, the former by Goldoni, the latter by Alfieri. Monti, Manzoni and Niccolini are among the later writers of tragedy, while of recent years D'Annunzio has won fame as a playwright.

The other European nations cultivated the dramatic art much later than the Italians. The English and Spaniards devoted their attention to it almost at the same time; the former reaching their acme in Shakespeare, the latter in Lope de Vega and Calderon. The first English comedy, *Ralph Roister Doister*, was published before 1551, while the first tragedy, *Gorboduc*, or *Ferrex and Porrex*, appeared some years later. The history of the English theater and drama is divided into two parts, the first of which begins with the reign of Elizabeth and ends with the reign of Charles I. The rapid development of the drama during the reign of Elizabeth was entirely unhampered by foreign influence. Lyly, Peele, Greene, Marlowe, Shakespeare, Ben Jonson, Beaumont and Fletcher, Chapman, Webster, Middleton, Marston, Ford and Massinger are among the chief names connected with this brilliant period of the English drama. During the Commonwealth the Puritans prohibited all kinds of plays, and the theaters were shut up for thirteen years. With Charles II the drama reappeared and exhibited a licentiousness hardly equaled by that of any other Christian nation. Among the chief names belonging to this period are Dryden, Otway, Lee, Shadwell and Wycherley. From the close of the seventeenth to the end of the eighteenth century, British comedy was cultivated with much success by Cibber, Farquhar, Congreve and others. As most noteworthy among the dramas of this period, however, must be mentioned Addison's *Cato*, Goldsmith's *She Stoops to Conquer* and Sheridan's *The Rivals* and *The School for Scandal*. Some of the famous poets of the nineteenth century, notably Browning, Tennyson and Swinburne, have written dramas, but much of their work is not well adapted for acting. The knowledge of what may be effectively presented on the stage has become clearer in recent years, and most modern plays are written with a view to their dramatic rather than to their literary value.

The French drama was in a miserable state before Corneille (1606-1684), who indeed is looked on as the founder of the drama in France. Racine, Molière, Voltaire, and in later times

Hugo, are some of the other distinguished French dramatists. Since about 1820 a new dramatic school has been formed in France, which, departing from the ancient strictness of what is called the classic, approaches more and more to the German or British, or what is called the romantic school. The establishment of this school formed part of the general reaction against the excessive adherence to classic models in literature, the leader in the movement being Victor Hugo. Among the modern French dramatists may be mentioned Alfred de Vigny, Alfred de Musset, Mérimée, Scribe, Dumas the Younger, Sardou and Edmond Rostand.

The German drama is of later birth than any we have mentioned, and for a long time the Germans contented themselves with translations and adaptations from the French. Lessing was the first who, by word and deed, broke the French sway, and he was succeeded by Schiller and Goethe, who rank as the greatest of the modern dramatists. Prominent names in the German drama are Kotzebue, Körner, Schlegel, Tieck, Brentano, Grillparzer, Hebbel, Ludwig, Gutzkow, Freytag, Sudermann and Hauptmann. Ibsen and Björnson are the chief names connected with the Scandinavian drama, while Belgium is represented by the symbolist Maeterlinck. In America, owing to the fact that for a long time any European play might be produced without change, playwriting received little stimulus. The passage of an international copyright law changed matters, and many good plays have been produced, although few if any of them can be called great plays. The history of the drama in America has not been unimportant, notwithstanding the scarcity of plays, because actors of note have been more numerous than playwrights, and they have contributed largely to the development of the drama.

The various classes of drama—tragedy, comedy, opera, pastoral, burlesque and farce—are noticed under their proper headings. See also the articles on the important authors mentioned above, and on famous actors.

**Dra'per**, ANDREW SLOAN (1848-1913), an American educator, born at Westford, New York. He first won distinction in the New York legislature and was appointed by President Arthur one of the judges of the Alabama claims. In 1886 he was elected superintendent of public instruction of New York and retained the position for six years, when he became a superintendent of schools in Cleveland, Ohio. In 1894 he was elected president of the University of



## Draper

Illinois, and in 1904 he was chosen commissioner of education for the State of New York. He is the author of *American Schools and American Citizenship*, *American Universities and the National Life*, *The Rescue of Cuba* and numerous articles in leading periodicals.

**Draper, JOHN CHRISTOPHER** (1835-1885), an American physician who practiced in the city of New York and is known by his writings on medical and scientific subjects. He was at different times professor of chemistry or natural science in New York University and the College of the City of New York. He was also editor of the *Yearbook of Nature and Science* and had charge of the department of natural science in *Scribner's Monthly*. Among his important works are *A Text-book on Anatomy, Physiology and Hygiene* and *A Text-book of Medical Physics*.

**Draper, JOHN WILLIAM** (1811-1882), famous as chemist and physiologist, but better known to the public as the author of philosophical histories. He was born in England, but came with relatives to America and took his degree of medicine at the University of Pennsylvania. He was one of the founders of the medical school of New York University. His discoveries in the chemical qualities of light led to great practical advances in photography, and to him should be given the credit for making the first photograph of the human face, in 1839. He wrote the *History of the American Civil War* and *The History of the Intellectual Development of Europe* (2 volumes). His most popular work is *History of the Conflict between Science and Religion*.

**Draughts, drafts.** See CHECKERS.

**Drave**, a European river which rises in Tyrol, flows across the north of Illyria and the south of Styria, between Hungary on the left and Croatia and Slavonia on the right, and joins the Danube 14 miles east of Essek. Its chief affluent is the Mur. It is about 450 miles long and is navigable for about 350 miles.

**Dravid'ian**, a term applied to the vernacular tongues of the great majority of the inhabitants of southern India and to the people themselves, who must have inhabited India previous to the advent of the Aryans. The Dravidian languages are generally considered to belong to the Turanian class.

**Draw'bridge.** See BRIDGE, subhead *Draw-bridges*.

**Draw'ing** is the art of representing upon a flat surface the forms of objects and their positions and relations to one another, though origi-

## Drawing

nally the term meant delineation, or representation by means of lines. The idea of nearness or distance is given by the aid of perspective, foreshortening and gradation. The term drawing, in its strict sense, is only applicable to representing forms of objects in outline, with the shading, or *modeling*, necessary to develop roundness. But the term is still used in its original sense, and the drawing of a draughtsman does not produce a picture of a machine or structure of any kind, but a diagram by means of which the object can be constructed. In like manner the architect does not make a picture of the outline of the house, but a diagram of the plan, and such a drawing is called a *mechanical drawing*. Drawing, in its restricted sense, may be considered of three kinds, *pen drawing*, *chalk drawing* and *drawing shaded with the brush or hair pencils*. *Pen drawings* are often confined to pure outlines, an appearance of *relief* or projection being given by thickening or doubling the lines on the shadow side. Finished pen drawings have all the shading produced by combinations of lines, called *hatching*. *Chalk drawings* (including lead pencil drawings) are best suited to beginners, as errors can be easily corrected. Black, red and white chalks are used. When the chalk is powdered and rubbed in with a stump, large masses and broad effects can be produced with much rapidity. A combination of hatching and stumping is generally preferable to adhering exclusively to either mode. *Drawings shaded with the brush* are outlined with the pencil or pen, the shading being laid on or washed in with the brush in tints of India ink, sepia or color. A *sketch* is a drawing in which the artist records the chief features of an object or scene. The choice of what to show and what to omit calls for a high artistic taste, and the sketch of a master is worth infinitely more than the highly finished drawing of an inexperienced hand.

The great schools of painting differ from one another as much in their drawings as in their painting. In Italy the Roman school, through Raphael's fine sense of the beautiful and expressive in form, and through his study of the antique became the true teacher of beautiful drawing. The Florentine school tried to surpass the Roman precisely in this particular, but it lost by exaggeration what it had gained by learning and a close study of anatomy. In the Lombard school a tender style of drawing is seen through harmonious coloring, and in the Venetian school the drawing is often veiled in the richness of the color. The Dutch school excels in a careful and

## Drawing

minute style of naturalistic drawing, combined with great excellence in coloring. The French school in the time of Poussin was very accurate in its drawing; at a later period its style betrayed a great amount of mannerism. David introduced again a purer taste in drawing and a close study of the antique, and these are qualities which distinguish his so-called classical school from the romantic and eclectic schools of a later period. The modern German masters have a style all of their own, acquired by independent study of nature, while the drawings of the British school are naturalistic, though of late they have become more accurate and expressive.

Representation of form is the basis of all plastic arts and hence drawing is the most important branch of study in art. Since the study of it exercises the faculties of observation and memory, develops muscle control in the form of skill and trains the hand and eye in intelligent coöperation, drawing has come to be recognized as of a special educational value and has therefore been introduced into the regular course of study in the public schools of nearly all countries. In the delineation of an object which is present before the eye there are necessarily three things involved: (1) observation, in which is included attention and perception; (2) memory, or the retention in the mind of the impressions of the object obtained by means of the eye, while the eye is withdrawn from the object to the drawing on the paper, and (3) the coöperation of the hand and eye. The aim of the teacher in the primary grade is to bring out the imaginative faculty of the child, and this is done by such work as weaving and modeling, in which the child becomes acquainted with common forms. Later on, the pupil learns to cultivate his powers of observation and to acquire skill in manual art by means of the varied exercises in drawing from simple objects of nature or from models of exact geometrical forms. The former is generally regarded as the more valuable, because they are things with which the pupil comes in daily contact and which are especially interesting because of their attractiveness. As the pupil advances, the objects become more complex. In the higher grades, casts, living models and other more difficult objects are used, whereby the pupil's powers of artistic expression are called forth. He is taught the proper method of procedure and learns the correct use of construction lines and blocking-in lines and various other principles. The work is done in charcoal, India ink, crayon or other media.

## Draw Poker

Mechanical drawing is also taught and furnishes an excellent drill in mental discipline. The pupil acquires the power of accurate observation, manual dexterity and precision of eye measurements, all of which are of great value in the common affairs of life, as well as in the study of art. Among the helpful works on the subject of drawing are Ausburg's *Drawing Books, One and Three*; Prang's *Course in Drawing for Graded Schools, Teachers' Manual*; Prang's *Drawing for Ungraded Schools, Manual*; also "Drawing in the Public Schools," *Report of the United States Bureau of Education*, and Tadd's *New Methods in Education*.

**Draw Pok'er**, a game of cards which is said to have originated in the United States and is the most popular gambling game of this country. It is played with the full pack of fifty-two cards and by any number of people, though the best game is played by from four to six persons. The score is kept with round, flat pieces of bone or ivory, which are known as *chips*. These are of different colors, and a distinct value is assigned to each color. Before beginning the game, these chips are distributed equally between the players. Five cards are dealt to each. The person to the left of the dealer places one or more chips upon the table. This is known as the *ante* and makes it certain that every player will take part in the game whenever the deal is at his right. When the cards have been dealt they are examined, and each player decides whether he will join in the game or not. If so, he puts two or more chips, as has been agreed upon, in the center and turns face down upon the table as many of his cards as he does not wish to use. When all the players have determined whether they will join in the game or not, the dealer gives to each player as many cards as he has discarded, so that each hand will contain five cards. The person to the left of the one who *antes* now bets whatever he wishes, by placing the required number of chips on the table. If no one equals this play, he takes all the chips that are on the table. If any player puts in an equal number he has a right to see the hand of the bettor, after which the higher hand takes the chips on the table. If any player wishes, he may, at any time after the first has bet, raise the bet by putting in more chips, in which case the other players in rotation have a right to equal or exceed his bet. In the latter case the play proceeds until all have bet an equal amount, or until only one player is left with more than the others. If all have an equal



## Drayton

amount, the hands are exposed and the highest one takes the chips. *Bluffing* is betting high on a weak hand, so as to make one's opponents fear to go in and in consequence lose their chips. The value of the hands, beginning with the lowest, is *one pair*, which means two of a kind, with three other cards of different denomination; *two pairs*, with one card of different denomination; *three of a kind*; *a straight*, which consists of five cards in sequence, not of the same suit; *a flush*, five cards of the same suit, not in sequence; *a full, full house or full hand*, three cards of the same denomination and a pair; *four of a kind*; *a straight flush*, five cards of the same suit in sequence; and *a royal flush*, which is a straight flush of the highest five cards in a suit.

**Dray'ton**, WILLIAM HENRY (1742-1779), an American Revolutionary patriot, born in South Carolina. He received his education in England, returning in 1764 after being admitted to the bar. He at first opposed the active patriots of the colonies and on this account was appointed privy chancellor of South Carolina and associate judge in 1774. In that year, however, after publishing anti-English pamphlets, he was removed and made president of the provincial congress of South Carolina by the patriots. He was the first chief justice of the state and became its president in 1777. The last year of his life he spent in the Continental Congress.

**Dreams**, *dreemz*, trains of ideas which present themselves to the mind during sleep. In dreaming there is no voluntary control over the current of thought, and the principle of suggestion has unlimited sway. Usually there is no coherence in the images that appear, but the most extraordinary contradictions excite no surprise in the dreamer. Occasionally, however, intellectual efforts are made during sleep that would be difficult to surpass in a waking state. It is said that Coleridge composed *Kubla Khan*, a beautiful fragment of a poem, while asleep, and similar actions have been recorded of other men. Dreams arise from very natural causes and are merely the result of mental processes, stimulated as are our thoughts during the daytime. A sensation of cold may cause one to dream of snowstorms and freezing; a ray of light may incite a dream of fire, or the action of an undigested meal may bring a train of horrible imaginings. Dreams may in a general way indicate the condition of a person's health and are the frequent accompaniment of some forms of disease.

## Dresden

**Dredging**, *drej'ing*, the process of removing mud, sand and other obstructions from the bottom of a body of water. Dredging is usually employed for the purpose of deepening harbors and removing obstructions to navigation. The form of dredge in most common use in the United States is that known as the *dipper* dredge. In its construction and working it very closely resembles a steam shovel, except that it is mounted on a barge, instead of on a car (See STEAM SHOVEL). The dipper holds from five to eight cubic yards and is emptied into a barge, which is held in position alongside the dredge. Several patterns of dipper are used. One for removing loose stones is in the form of a clam-shell, hinged at the back. Another, known as the *grapple* dredge, opens and closes around the earth or stones to be lifted and is of advantage where a direct vertical motion is necessary. Another form of dredge useful in soft bottoms consists of a series of buckets, fastened to an endless chain, which is supported in such a manner that it can be raised and lowered to enable the buckets to scoop up the silt from the bottom.

**Dred Scott Decision**, a decision of the United States Supreme Court, delivered by Chief Justice Tancy, March 6, 1857, in which important questions concerning slavery were decided. The plaintiff, Dred Scott, was a slave in Missouri; his owner took him to Illinois, a free state, then to Minnesota, a free territory by the Missouri Compromise, and finally back to Missouri, a slave state. The plea of Scott was that his residence in Illinois and Minnesota made him a free man. The Supreme Court of Missouri decided against him, and the United States Supreme Court upheld this decision. It decided that Scott was not a citizen; and in additional statements declared that a negro was not considered in American law to be a man, but a chattel, "without rights or privileges except such as those who held the power and the government might choose to grant him." The decision practically admitted slavery to every territory in the Union. It aroused intense indignation in the North and was one of the important incidents that led to the Civil War. See UNITED STATES, subhead *History*.

**Dreibund**, *dri'boont*, THE. See TRIPLE ALLIANCE.

**Dresden**, *drez'den*, the capital of the kingdom of Saxony, on the river Elbe, 111 mi. s. of Berlin. Among the chief edifices, besides several of the churches, are the Museum, in the northeast wing

of the building called the Zwinger, a beautiful structure containing a famous picture gallery and other treasures; the Japanese Palace, or Augusteum, containing the royal library of from 300,000 to 400,000 volumes, besides a rich collection of manuscripts; the Johanneum, containing the collection of porcelain and the historical museum, with a valuable collection of arms, armor and domestic utensils, belonging to the Middle Ages. The royal palace is unattractive externally, but it has a fine interior. It contains a valuable collection of curiosities, jewels, trinkets and works of art. The court theater is one of the finest structures of the kind in the world. The city is distinguished for its excellent educational, literary and artistic institutions, among which are the Polytechnic School, much on the plan and scale of a university; the conservatory and school of music and the Academy of Fine Arts. The manufactures are not unimportant and are various in character; the china, however, for which the city is famed, is made chiefly at Meissen, fourteen miles distant.

The chief glory of Dresden is the gallery of pictures, one of the finest in the world, which first became of importance under Augustus II, king of Poland and elector of Saxony, but which owes its most valuable treasures to Augustus III, who purchased the greater portion of the gallery of the Duke of Modena for \$900,000. The pictures number about 25,000. Besides this fine collection, the museum contains also engravings and drawings amounting to upwards of 350,000. Dresden, being thus rich in treasures of art and being favored by a beautiful natural situation, is the summer resort of many foreigners. It suffered severely in the Thirty Years' War and also in 1813, when it was the headquarters of Napoleon's army. It was occupied by the Prussians in 1866, but was evacuated in the following spring. Population in 1910, 546,882.

**Dresden**, BATTLE OF, a battle fought in 1813, between the French, under Napoleon, and the allied Austrians, Russians and Prussians, under Schwarzenberg. Napoleon had come to the relief of Dresden, which was occupied by the French. The allies assaulted and bombarded the city, and soon after a great pitched battle was fought (August 27), the allies being defeated.

**Dresden China**, a delicate, highly finished China, made at the royal factory at Meissen, near Dresden, in Saxony. It was first made in 1709, when Johann Friedrich Böttger, chemist to the elector of Saxony, discovered the necessary materials. The manufacture has continued to

the present day and includes pieces for decoration and all kinds of uses, and its designs are of great variety, in relief, in color and in gold. Vases, statuettes, groups of figures, candelabra, clocks and other articles are often made of Dresden china and are highly prized.

**Dress or Costume**, taken in a general sense, the clothing and ornaments of a person; especially, the established mode of dress peculiar to a nation or tribe of people. Our knowledge of the dress of the earliest peoples is obtained from rude sketches and sculptures and from myths and traditions. Sculptures found in Mesopotamia and Egypt, dating from 300 B. C., show a garment made of a large oblong piece of cloth, carried over the left shoulder and under the right arm, the two edges overlapping on the left side of the body and the left leg. This garment seems to have been commonly used among men and women of high position. Other persons wore only a piece of cloth hanging from a waist belt over the thighs. The Assyrians, who were skilled in dyeing, weaving and embroidering, came to be celebrated for the richness of their attire. It was characteristic of the ancient Greeks that they wore very simple and graceful costumes. In earliest times the dress of the men consisted of a *himation* or *chlamys* only, a garment worn open on one side; later a *chiton*, a close-fitting, sleeveless shirt, reaching below the knees, was worn under the himation. The women wore a loose chiton of fine linen, reaching to the feet and confined below the bust by a girdle. Sometimes a woolen shawl, called a *peplos*, was draped over the chiton. The costume of the ancient Romans was similar to that of the Greeks. They had one characteristic garment, the *toga*, a large, loose cloak, under which was a chiton, called a *tunic*. The only other garment was a sandal worn to protect the foot.

We have no record of the time when the Chinese were not clothed in accord with their rank and station. Their dress to-day is practically the same as it was in the oldest times of which we have any knowledge. Those who have drudgery to perform may go almost naked, but, ascending in the order of rank, clothing becomes more complete and costly. A loose, blue blouse of silk or cotton, fitting closely around the neck, and short, wide trousers are the principal garments. The women's dress differs from that of the men in headdress and foot gear. In Japan the ordinary costume of both sexes consists of a number of loose, wide gowns, worn over one another and held in place by a sash. The sleeves



are very long and wide. People of high rank wear costly silks and have a family crest embroidered on the back and breast of the outer garment. European dress, however, is becoming common among the Japanese. In India the principal garment is usually a piece of cotton, linen or silk, about four feet wide by twelve feet long, carelessly wrapped around the body. Women now generally wear a petticoat under this garment. The arms and legs are bare, except when covered by jewels.

When the Romans invaded northern Europe the attire of the barbarian chiefs consisted of striped pantaloons and a shirt having sleeves. The women wore simple, loose gowns, usually of wool, with sleeves and girdle. In the Middle Ages the nobles and knights were so constantly engaged in fighting that the most important feature of their attire was necessarily the armor. Both men and women wore cloaks so long that all other details of the costume were concealed. There was never much of a tendency among any ancient people, except the Chinese, to try to fit the clothing to the figure, but near the end of the Middle Ages garments came into fashion which required careful cutting and fitting and much sewing. The dress for women was close-fitting about the bust, waist and hips and gored so as to be very loose and full in the skirts. That for men consisted of a tight-fitting coat, called a *doublet*, laced or buttoned close to the body, and long, snug-fitting stockings. The costumes of the last years of the sixteenth century were marked by excessive extravagance and elaborateness of design, color and material. In modern times the most graceful and artistic costume for men is perhaps that worn in the age of Louis XIV of France. It consisted of short trousers and loose doublet, reaching a little below the waist and generally worn unbuttoned so as to show the soft, full shirt front; a short cloak, usually worn on the left shoulder; a broad, soft, lace-trimmed collar and a wide felt hat with a soft, drooping feather. The women of this period wore a low-cut, easy-fitting bodice with ruffled elbow sleeves.

There was a general tendency to simplicity after the French Revolution, and from the dresses worn at this time all our modern fashions have followed. Styles vary from year to year and from season to season in the cities of Europe and of America. It is only in remote country places in Europe that any of the old-time costumes are now worn. For instance, the Highland Scot still wears his belted plaid, and the

Tyrolese mountaineer his short breeches, green blouse, conical hat and picturesque cloak. In North America the Eskimo wears a hood, short trousers and boots of fur and feathers, a costume similar to that of the earliest Eskimos of whom we have any record. The American Indian in many places wears only a loin cloth and blanket, such as the early redmen wore, but, barring these and a few other exceptions, no one style of dress has been common in Europe and North America during the past two centuries. The same general articles of dress have been worn, but the color, shape and trimmings of these garments have varied according to the dictates of fashion, which is governed by the influential classes, and is quite uniform each season throughout Europe and America. Modern dress, however, is not absolutely dependent on the changes of fashion, as there is a tendency toward dress reform in regard to women's clothing. The general interest of women in out-of-door exercise and the need for clothing which gives freedom of movement has an influence on their dress.

**Drew, DANIEL** (1788-1879), an American capitalist and philanthropist, born in Carmel, N. Y., where he was first employed as a cattle drover and dealer. Later he became interested in steamship lines and railroads, for a time in partnership with Cornelius Vanderbilt. He also founded the banking firm of Drew, Robinson & Co., which became one of the best-known stock brokerage concerns in the country. Drew later suffered losses through the failure of Kenyon, Cox & Co., in which firm he was a partner, and was forced into bankruptcy. Previously, however, he had given liberally to the Methodist Church and allied institutions, and in 1866 he had founded Drew Theological Seminary at Madison, N. J.

**Drew, JOHN** (1853- ), an American actor, son of John Drew, Sr., and Louisa Drew, both actors of some note. At his mother's theater in Philadelphia he made his first appearance, and three years later he went to New York, where in the years which followed he took various parts under Edwin Booth, Fanny Davenport and other stars. From 1875 to 1892 he was connected with Augustin Daly's company, of which he was for years the leading comedian, winning great popularity as Petruchio in the *Taming of the Shrew* and as Charles Surface in *A School for Scandal*. In 1892 Mr. Drew began starring on his own account and has since produced very successfully a number of plays, among which are *A Marriage of Convenience*, *The Liars*

*Richard Carvel* and *The Duke of Killiecrankie*.

**Drex'el**, ANTHONY JOSEPH (1826-1893), an American banker and philanthropist, born in Philadelphia. He was the head of the firm of Drexel & Co., Philadelphia, having been identified with it since the age of thirteen. He was a liberal patron of science and art, especially music. The Drexel Institute of Art, Science and Industry, Philadelphia, was established in 1891 by Mr. Drexel, with an endowment of \$2,000,000. He was also associated with his friend George W. Childs in the inception of the Childs-Drexel Home for Union Printers at Colorado Springs, Colo. See DREXEL INSTITUTE.

**Drexel Institute of Art, Science and Industry**, a coeducational institution founded in Philadelphia in 1891 by Anthony J. Drexel. The purpose of the institute is to provide instruction and training in the arts and sciences directly related to industries. It maintains courses in electrical engineering and fine and applied arts, commerce and finance, mechanical drawing and machine construction, domestic science, mathematics, physics, chemistry and English. Both day and evening classes are provided in all departments, and free public lectures are maintained. Admission is through examination or upon the diploma of an approved high school. The building and equipments exceed \$4,000,000 in value, and there is an endowment fund of \$2,000,000. The library numbers about 30,000 volumes, and the reading room is supplied with all the leading periodicals. The number of students in the day classes exceeds 1200, and in the evening classes, 2000.

**Dreyfus**, *dra'fus*, ALFRED (1859- ), a French artillery officer, born in Upper Alsace, of Jewish parentage. He moved to Paris in 1874 and took up a course of study to prepare himself for his profession. In his studies and in his service in different regiments he proved himself most able, and in 1891 he was appointed to the general staff. Three years later, without warning, he was arrested on a charge of having sold military secrets to a foreign government. The court which tried him was a secret one, and although Dreyfus was allowed counsel, he was condemned on the most inadequate evidence and was sentenced to solitary imprisonment on Devil's Island. Over the entire world great indignation was aroused by his trial and by the severity with which he was treated during his imprisonment. Gradually the conviction became general that Dreyfus was innocent and

had been the victim of a conspiracy. This conviction was strengthened by reliable testimony that Major Esterhazy, an officer of doubtful character, had written the memorandum known as the *bordereau*, an important document which had been produced against Dreyfus. The effects of the case were far-reaching. The reputations of high officials were ruined, the Brisson ministry resigned and great corruption was disclosed in the French army. Throughout the trial, and afterward, the most active defenders of Dreyfus were his brother, Matthieu Dreyfus, and Emile Zola, the novelist (See ZOLA, EMILE). At a second trial, in 1899, Dreyfus was again convicted, but on September 19, 1899, he was pardoned by President Loubet. Retiring to his country estates, he began a fight for vindication. This ended in complete success in July, 1906, when the Supreme Court of France acquitted him of the charge of any wrongdoing and rebuked his accusers. He was then made a major in the army and was enrolled in the Legion of Honor.

**Drift**, the name applied to deposits that were formed during the Glacial period. The matter composing drift was either carried or pushed along by the glaciers and left wherever they grounded, or where the lower end of the glacier melted. It usually forms compact, structureless deposits of varying thickness. It is known by the names of "boulder clay" and "older diluvium." The stones in drift are usually oblong or oval, are highly polished and have rounded edges. Some of the larger rocks contain *striae* which run parallel to their longer axis. See GLACIAL PERIOD; GLACIERS.

**Dromedary**, *drum'e da ry*, a light, fleet camel. The name is applied both to a variety of the Arabian camel and also to a variety of the Bactrian. It is used for travel and will cover about five hundred miles in six days. It can live on a very small amount of food and requires only short periods for rest. The jolting can be long endured only if one is used to it. See CAMEL.

**Drown'ing** means death by suffocation, the air being excluded from the lungs by a liquid. It is only necessary that the mouth and nostrils be immersed to cause death in this manner. It is probable that complete insensibility comes within one or two minutes after such immersion, but death does not ensue until from two to five minutes after, and cases have been known where persons recovered after having been under water a much longer time. As in other forms of asphyxiation, efforts to restore life to a patient



## Drowning

should not be abandoned for a long time, even though no apparent signs of life exist. Instances are known where people have returned to life after hours of apparent death. In all attempts to resuscitate the drowned, prompt action is necessary, but excitement, confusion and haste are not only unnecessary but are really wasteful of time and energy. The rescuer should proceed after some such plan as the following, which was suggested by Dr. Benjamin Howard of New York:



DROMEDARY

Place the body on its face with a roll of clothing under the stomach, the head being supported on the hand. Pull the body over the roll of clothing, to expel the water from the chest; if necessary, press upon the back from the waist toward the shoulders. If the tongue closes the mouth, take it between the fingers, pull it forward and hold it downward. Cleanse the mouth and nostrils from sand or dirt, if they have entered. When the lungs are thoroughly emptied, turn the body on the back and support the shoulders. If the person is past breathing,

## Druids

begin at once to stimulate artificial respiration, as described below. In the meantime, if other people are present they should rub the upper part of the body and the limbs vigorously and continuously to encourage circulation, and if the body is very cold, they should lay bottles of hot water about it; but remember that too much heat is dangerous.

Artificial breathing may be induced in the following manner: While the body is lying on its back, with the shoulders slightly raised,

kneel over it; place both hands on the lower part of the chest, so that the thumbs hook in under the lowest ribs and the fingers are spread out on the chest; steadily press forward, raising the ribs, your own body being thus thrown forward.

This enlarges the cavity of the chest and causes air to enter. When the ribs have been raised to the utmost extent, push yourself back, with a slight effort, to a more erect position, allowing the ribs to return to their natural position. This expels the air. Repeat the process fifteen times a minute. Be careful that the tongue does not fall backward and close the windpipe; if necessary, fasten it forward with a band around the jaw. It is never necessary to be rough with the patient. Gentle, firm and regular movements

are the best. As soon as the person is sufficiently restored to be able to swallow, give small quantities of hot brandy and water, hot wine and water or hot coffee, and use every effort to restore and maintain warmth.

**Drug'gist.** See APOTHECARY.

**Dru'ids**, the priests of the Celts of Gaul and Britain, who, according to Julius Caesar, possessed the greatest authority among the Celtic nations. They had some knowledge of geometry and natural philosophy, superintended the affairs of religion and morality and performed



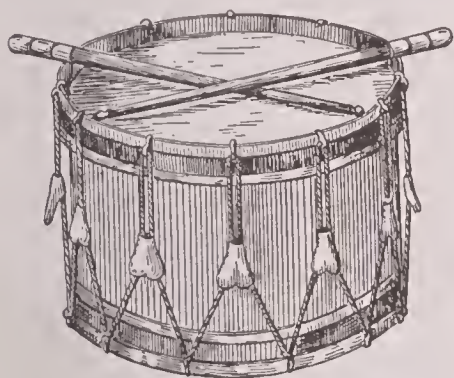
## Drum

the office of judges. They venerated the mistletoe when growing on the oak, a tree which they likewise esteemed sacred. They had a common superior, who was elected by a majority of votes from their own number, and who enjoyed his dignity for life. They took unusual care to fence themselves round with mysteries, and it is probable that they cherished doctrines which were unknown to the common people; but that they had a great secret philosophy which was handed down by oral tradition is very unlikely. The public ceremonies were held round rude stone altars and in circles of stones set on end. Such circles may be seen at Stonehenge in England, but it is thought by scientists that the Druids merely made use of the work of people who lived long before their time. The Druids were nearly exterminated by the Romans in their occupancy of England.

**Drum**, a musical instrument played by being beaten with sticks. It is either cylindrical or hemispherical in shape, with the end or ends covered with tightened parchment, which is stretched or slackened at pleasure by means of cords with sliding knots or screws. Drums are of three kinds: 1, the *long*, or *bass*, *drum*, played with drumsticks having stuffed knobs on the end, and used only in large orchestras or military bands; 2, the *snare drum*, having two heads, the upper one only being played upon



KETTLEDRUM



SNARE DRUM

by two sticks of wood; strings, or snares, are stretched across the lower one, giving a peculiar resonant tone; 3, the *kettledrum*, a hemisphere of brass or cop-

per, the end of which is covered with parchment. Kettledrums are always used in pairs, one being tuned to the keynote, and the other to a higher key, the compass of the two together being an octave. The drum is of Eastern origin and is the oldest of existing instruments. See TOM-TOM.

**Drum'mond**, HENRY (1851-1897), a renowned preacher, professor and author, born at Stirling,

## Drummond

Scotland, educated at Edinburgh University and the University of Tübingen, Germany. In 1877 he became professor of natural science in the Free Church College of Glasgow. During one of his vacations he visited America on a geological expedition to the Rocky Mountains. The lectures given during this tour furnished the foundation for his *Natural Law in the Spiritual World*. He also explored Australia and Africa in search of certain rare species of animal life. In 1893 he traveled through the United States, lecturing before college students and in the larger cities. Up to the time of his death he was engaged in religious work in the colleges of England and Scotland and with Dwight L. Moody in the United States. He was a magnetic preacher and a vigorous, stimulating writer. The works upon which his fame rests are *Natural Law in the Spiritual World*, *The Greatest Thing in the World*, *Pax Vobiscum*, *Tropical Africa* and *The Ascent of Man*, a reply to extreme Darwinian views.

**Drummond**, THOMAS (1797-1840), a Scotch inventor, born at Edinburgh. He was educated



HENRY DRUMMOND

at Edinburgh and at Woolwich, entered the army as an engineer and became assistant to Colonel Colby in the trigonometrical survey of Great Britain and Ireland. He invented a heliostat and first used the lime-ball light, which bears his name, about 1825, during the survey of Ireland. He subsequently entered political life and became undersecretary for Ireland, a coun-



## Drummond

try which he practically ruled with great success for five years.

**Drummond**, WILLIAM (1585-1649), of Hawthornden, a Scottish poet. He was educated at the University of Edinburgh and was the first Scottish writer to abandon the native dialect for the language raised to supremacy by the Elizabethan writers. As a historian he is chiefly remarkable for an ornate style and a strong attachment to the High Church principles of the Jacobites.

**Drummond Island**, an island in Lake Huron, the only one of the Manitoulin Islands which belongs to the United States. It is a part of Clippewa County, Mich. See MANITOULIN ISLANDS.

**Drummond Light** or **Lime Light**, a very intense light produced by turning two streams of gas, one of oxygen and the other of hydrogen, in a state of ignition, upon a ball of lime. This light was proposed by Captain Drummond to be employed in lighthouses. It is now used in stereopticons and in theaters for producing stage effects. The gases are stored in copper cylinders under pressure, and illuminating gas is used in place of hydrogen.

**Drum'mossie Moor**. See CULLODEN MOOR.

**Druses**, *drooz'ez*, a curious people, of mixed Syrian and Arabian origin, inhabiting the mountains of Lebanon and Anti-Lebanon. Their faith is a strange mixture of Mohammedanism and superstitions of various kinds. They are a self-contained people, and the secrets of their religion are not well understood. There are about 90,000 in all.

**Dry'ads**, in classical mythology, the nymphs who had special care of vegetation.

**Dry'den**, JOHN (1631-1700), an English poet, dramatist and satirist, the greatest writer of the Restoration period in England. He was descended from an ancient family, his grandfather being Sir Erasmus Dryden of Canons Ashby, Northamptonshire. He was born near Aldwinkle, Northamptonshire, and was admitted as a king's scholar at Westminster, whence he went to Trinity College, Cambridge, where he had been elected to a scholarship. After leaving the university he went to London as secretary to his cousin, Sir Gilbert Pickering, a favorite of Cromwell; and on the death of the Protector he wrote his *Heroic Stanzas* on that event, his first poem of importance. Although this showed a true appreciation of Cromwell's greatness, Dryden published two years later a poem in

## Dryden

celebration of the restoration of Charles II. His first drama, *The Wild Gallant*, was produced in 1663 and it was not successful. From this time on, in rapid succession, he wrote almost thirty dramas and proved himself the greatest dramatist of his time. With all his great powers, however, he made no attempt to elevate the stage, but pandered to the corrupt tastes of the



JOHN DRYDEN

time, so that many of his dramas are disgustingly immoral. In 1670 Dryden was appointed to the offices of royal historiographer and poet laureate. The first of his political satires, *Absalom and Achitophel*, was produced in 1681, its aim being to censure the earl of Shaftesbury and his followers, who were trying to secure the succession to the throne for the duke of Monmouth. This was followed by *The Medal*, a satire against sedition, and *Mac Flecknoe*, a satire on the poet Shadwell. As a member of the Church of England, Dryden wrote, in defense of that church, his *Religio Laici*; but when, after the succession to the throne of the Catholic James, Dryden became a Catholic, he declared his new beliefs in the *Hind and Panther*. When William and Mary came to the English throne, Dryden was deprived of the offices of poet laureate and historiographer. During the remaining ten years of his life he produced some of his best work, including his admirable translations from the

## Dry Farming

classics and his *Ode in Honor of Saint Cecilia's Day*, better known as *Alexander's Feast*, one of the finest odes in the English language.

**Dry Farming**, a system of tillage adapted for semi-arid regions. In semi-arid regions rainfall during the growing season, when it is most needed, is practically unknown. The problem presented to the farmer, therefore, is how to store the small amount of water from the spring or fall rains until the plants need it, and then to prevent its evaporation during the growing season. The purpose of dry farming is to reclaim for agricultural purposes land areas which cannot be irrigated and have insufficient rainfall to produce profitable crops under ordinary methods of cultivation. Where the annual rainfall is less than 20 inches, ordinary methods of farming are not productive.

Dry farming is essentially a method of preparing the soil so that it will hold moisture as long as possible. The process of cultivation consists chiefly in deep, fall plowing, followed by harrowing. The disk harrow should be used before sowing and later as long as the growing crops permit. The deep plowing and frequent harrowing form a mulch of fine soil upon the surface which prevents evaporation. An important feature of the preparation of the soil is the use of the roller or sub-surface packer. Campbell, in his *Soil Culture Manual*, says that the "packer must follow close to the plow. The plowing done before noon should be packed before going to dinner, and that done in the afternoon packed before leaving the field at night."

The best crop for dry farming seems to be wheat. Corn is also profitable, and potatoes, sugar beets, alfalfa, and even peaches and other fruits have been successfully cultivated. There are, at the present time, about 800,000 acres in the United States and Canada available for dry farming. Nearly all of this area is in the western states, from Arizona north to Montana, and in southern Alberta and Saskatchewan. Consult Campbell's *Soil Culture Manual* and Widtsoe's *Dry Farming*.

**Dry Tortugas**, *tor too' gaz*, a group of ten small islands belonging to Monroe co., Florida, situated in the Gulf of Mexico, about 120 mi. w. by s. w. of the southern extremity of Florida Peninsula. The islands are low and partially covered with mangrove bushes. One contains a lighthouse, another, an old fort, which during the Civil War was used as a penal station.

**Du Barry**, *du ba re'*, MARIE JEANNE BECU. Countess (1743-1793), a mistress of Louis XV,

## Dublin

He became infatuated with her about 1769 and married her to the Comte Du Barry so that she might be brought to court. Until the death of Louis she was the real ruler of the country, and the most vital points in the policy of the government were decided by her. She was banished from the court after the death of Louis XV, and during the Revolution she was tried for having dissipated the public wealth and was executed.

**Dub'lin**, the capital of Ireland, is situated in Dublin co., 135 mi. w. of Liverpool, on the east coast of the island, at the mouth of the Liffey, the banks of which for more than two miles from the sea are lined with docks. At right angles to the river is Sackville street, a splendid street 700 yards long and 40 yards wide, forming a thoroughfare which is continued across the river by O'Connell Bridge, a magnificent structure the same width as the street. The principal public secular buildings are the Castle, the official residence of the viceroy; the Bank of Ireland, formerly the Irish Parliament house; Trinity College; the courts of justice; the customhouse; the King's Inns; the postoffice; the rotunda; the corn exchange; commercial buildings; the mansion house, and the city hall, or corporation buildings. The most important educational institutions are Trinity College (Dublin University), the Royal University, the Royal College of Science, the Roman Catholic University and the Royal Dublin Society. The environs of Dublin are remarkably beautiful. A little northwest of the city, up the Liffey, is Phoenix Park, with an area of 1759 acres, and Glasnevin, once the favorite residence of Swift, Steele and Sheridan, all of whom were born in Dublin. Dublin was taken by the Danes in the ninth century and was in their possession until the English conquest. Population in 1911, 309,272.

**Dublin**, UNIVERSITY OF, an institution founded in 1591 by Queen Elizabeth, as the College of the Holy and Undivided Trinity, the University and Trinity College being practically the same. The corporation now consists of a provost, seven senior fellows, twenty-six junior fellows and seventy foundation scholars. The senate of the university consists of "the chancellor of the university, or, in his absence, of the vice-chancellor, and such doctors or masters of the university as shall have and keep their names on the books of Trinity College." The senate possesses the right of electing the chancellor of the university; it is also the body which grants degrees. The scholarships are tenable for five years, or till the degree of M. A. is attained.



## Dubois

Admission is by examination, and the course of general instruction extends over four years. The number of students is usually about 1300.

**Dubois'**, PA., a borough in Clearfield co., 80 mi. n. e. of Pittsburg, on the Pennsylvania and the Buffalo, Rochester & Pittsburg railroads. Coal mining and lumbering are the principal occupations, but there are also iron works, tanneries and lumber mills, besides manufactures of mining and agricultural implements. Dubois was settled in 1873 and was made a borough in 1881. Population in 1910, 12,623.

**Dubois**, FRED T. (1851- ), an American politician, born in Crawford County, Ill. He graduated at Yale in 1872 and in 1880 went to Idaho, where he engaged in business. He became United States marshal in 1882, was conspicuous in the anti-Mormon agitation in the following years and was delegate of the territory in Congress from 1887 to 1891. He was influential in securing the admission of Idaho as a state and was its first United States senator (1891-1897). He withdrew from the Republican national convention in 1896 and supported Bryan, but was defeated for the Senate in the following year. He was elected as a Democrat in 1901, and served until 1907.

**Dubuque**, *doo buke'*, IOWA, the county-seat of Dubuque co., about 167 mi. n. w. of Chicago on the Mississippi River and on the Chicago Great Western, the Chicago, Burlington & Quincy, the Illinois Central and the Chicago, Milwaukee & Saint Paul railroads. The city is an important agricultural market and has lead and zinc mining interests. There are also railroad repair shops, flour and lumber mills, breweries, manufactures of boots and shoes, wagons, hardware and furniture. The two sash and door factories and the pump factories are said to be the largest of their kind in the world. The sheet metal works rank third largest in the world. The city has a public library and a United States government building and is the seat of Saint Joseph's College, Mount Saint Joseph's Academy, the German Presbyterian School of the Northwest, the Iowa Institute of Science and Arts and Woodbury Seminary. It is the oldest city in the state and was named in honor of Julian Dubuque, a French Canadian, who located here in 1778. The first permanent settlement was made in 1833. Population in 1910, 38,494.

**Duc'at**, a coin formerly common in several European states, especially in Italy, Austria and Russia. It was of either silver or gold, the average value of the former being 75 cents to

## Duck

\$1.10. and of the latter, about \$2.32. The most famous of the ducats are those of ancient Venice, whose value was about \$1.46. Austria-Hungary still issues coins of this name.

**Du Chaillu**, *du sha yu'*, PAUL BELLONI (1838-1903), a famous African explorer, born in New Orleans, of French parents. His father was a trader in Africa, and while he was young he spent much time in Africa making the acquaintance of different tribes and their languages. When he was eighteen, he set out on a regular exploring expedition. During the four years in which he was engaged in this he discovered many plants and animals which had never been known of before, and his reports were for some time scoffed at by scientists, who felt that they were incredible. He brought back with him several gorillas, which had never been hunted and which had rarely been seen by any European. The result of his journey was published in 1861, and two years later he set out on a second exploring expedition, an account of which, under the title, *A Journey to Ashango Land*, appeared in 1867. *The Land of the Midnight Sun*, an account of a tour in northern Europe, had great popular success.

**Duck**, a web-footed bird, related to the swan and goose. The ducks are very numerous and are met with all over the world. The species can be classed as *deep sea* ducks, which often obtain their food by diving to a great depth, and *river* ducks, which remain in shallow water. Some species are migratory, going northward in summer to their breeding places. The duck's food is partly vegetable, partly animal.

The common *mallard*, or wild duck, is the original of the domestic duck. In its wild state the male is characterized by the deep green plumage of the head and neck, by a white collar separating the green from the dark chestnut of the lower part of the neck and by having the four middle feathers of the tail recurved. Some tame ducks have nearly the same plumage as the wild ones; others vary greatly, being generally duller or pure white, but all the males have the four recurved tail feathers. There are several favorite varieties of the domestic duck, those of Normandy and Picardy in France and the Aylesbury ducks in England, being remarkable for their great size and delicacy of flesh. The *musk duck*, erroneously called the *Muscovy duck*, a native of South America, is the largest of the duck kind and approaches nearly the size of a goose. The *canvasback duck* is peculiar to America and is celebrated for the excellence of

## Duck-billed Platypus

its flesh. Other species of ducks are the *shoveler*, remarkable for the strange form of its bill; the *gadwall*, which is more rare in America than in Europe; the *pintail*, remarkable for its long tail; the *black*, or *dusky duck*, peculiar to America, and very abundant; the *summer*, or *wood duck*, remarkable for its great beauty and for its migrations, which are directly opposed to those of other species; the *teal*, prized for its flesh, and the *eider duck*, so well known for its down. See EIDER DUCK; GADWALL; SHOVELER.

**Duck-billed Platypus** or **Duckbill**, also called *ornithorynchus*, the lowest of the mammals, a peculiar creature, living in the quiet streams of Australia, Tasmania and New Guinea. It is



DUCK-BILLED PLATYPUS

about twenty inches long, rather slender and covered with brown hair. Its head is small, and instead of a nose it has a horny bill, resembling that of a duck, except that the nostrils are at the extreme end, so that the animal can breathe with only the tip of his bill out of water. The male has on the heel a sharp horny spur, which he uses as a means



DUCKBILL ASLEEP

of defense. Duckbills usually live in large colonies. each pair in a burrow made in the bank of a stream. The burrows are furnished with two openings, one above the water and one below, and sometimes they are extended a long distance into the bank. The food consists chiefly of insects and worms, which the animal comes out to get at night. On land duckbills walk about very clumsily on their short legs and webbed feet, but in water they are able to move very rapidly.

**Duck'ing Stool**, a device which was used in Great Britain and in the American colonies to punish a scold. It was composed of a chair fastened at the end of a strong beam, which, by means of a pivot, could be dipped into a pool or river. The scold was placed in this chair,

## Duel

fastened securely and then dipped into the water. In some parts of England the ducking stool was in use up to the early years of the nineteenth century.

**Duckweed**, a little plant consisting of a flat cluster of very small leaves, minute flowers and little white rootlets. Duckweed is found floating in great quantities on the surface of shallow ditches and pools, which sometimes it covers with a broad green mat. It is eaten by ducks and other water fowl.

**Ductility**, the property of solid bodies, particularly metals, which renders them capable of being drawn into wire. The following is nearly the order of ductility of the metals which possess the property in the highest degree, that of the first mentioned being the greatest: gold, silver, platinum, iron, copper, zinc, tin, lead, nickel. Gold can be drawn into wire so fine that 500 feet of it will weigh less than a grain, and platinum, when combined with silver, can be drawn into wire 1-30,000 of an inch in diameter. Glass can be drawn into a thread so fine that a mile of it will weigh only one-third of a grain.

**Dudevant**, *du d'vahN'*, MADAME. See SAND, GEORGE.

**Dud'ley**, JOSEPH (1647-1720), a colonial governor of Massachusetts, born in Roxbury, Mass. He was the son of Thomas Dudley, a former colonial governor. He graduated at Harvard in 1665 and studied theology, but in 1673 he became a magistrate in Roxbury. In 1682 he visited England on behalf of the colonists, but became an ardent loyalist and was appointed to several high offices in New England and New York, in all of which he was arbitrary and tactless. In 1693 he again went to England, to become lieutenant governor of the Isle of Wight. In 1702 he returned to the United States and became governor of Massachusetts. This office he occupied until 1715.

**Dudley**, THOMAS (1576-1653), second colonial governor of Massachusetts Bay Colony. He was born in Northampton, England, and accompanied Winthrop to America in 1630, being appointed deputy governor. He was four times chosen governor of the colony, was a leading spirit in the establishment of Harvard College, founded Cambridge, Mass., and was twice president of the New England Confederation. He led the party of radical resistance to England.

**Du'el**, (from Latin *duellum*, from *duo*, two), a prearranged combat between two persons,



## Duero

with deadly weapons, for the purpose of deciding some private difference or quarrel. The combat generally takes place in the presence of witnesses, called *seconds*, who make arrangements as to the mode of fighting, place the weapons in the hands of the combatants and see that the laws they have laid down are carried out. The origin of the practice of dueling is referred to the trial by wager of battle, which obtained in early ages, although it was to some extent the outcome of the spirit and institutions of chivalry. In France, especially, dueling became common, and it is calculated that during eighteen years, in the reign of Henry IV, four thousand persons were killed in duels. Some French kings opposed the practice, while others promoted it, supposing that it tended to maintain a military spirit among the people. Dueling still prevails in France to a certain extent; but the combats are usually bloodless and ridiculous affairs. In the German army and the German universities the practice is common, though generally prohibited by law. The duels of German students, so often spoken of, seldom have serious consequences. While dueling was never as widespread in England as in France, it was common enough to call for constant attempts on the part of the government to suppress it. Only within the last half century, however, has the custom practically died out. In the United States duels are now very rare. In some of the states the killing of a man in a duel is punishable by death or by forfeiture of political rights, and in a large number the sending of a challenge is a felony.

**Duero**, *dwa'ro*, or **Douro**, one of the largest rivers of the Spanish peninsula, which, flowing west, traverses about one-half of Spain and the whole of Portugal, and after a course of 500 miles falls into the Atlantic 3 miles below Oporto. It is navigable for small vessels for about 70 miles.

**Duff**, ALEXANDER (1806-1878), a Scotch missionary to India. In 1829 he went to Calcutta as the first missionary of the Scottish Church of England, and he founded at Calcutta a school, which he intended to expand later into a college. In 1843, when the Church of Scotland was divided, he was obliged to give up his school and mission to the Established Church, as he adhered to the Free Church, but he soon established a new institution. The University of Calcutta was founded partly through his agency.

**Dufferin and Ava**, *ah'vah*, FREDERICK TEMPLE HAMILTON BLACKWOOD, Marquis of

## Dulcimer

(1826-1902), a British statesman, educated at Eton and Oxford. He served on various important missions and in various government offices before his appointment, in 1872, to the position of governor general of Canada. This office he held for six years, and he made himself very popular. After serving as ambassador to several European countries, he was sent in 1884 to India as viceroy, and he accomplished among other things the annexation of Burma and the establishment of the boundary line of Afghanistan.

**Duf'fy**, CHARLES GAVAN, Sir (1816-1903), an Irish patriot. He was prominently identified with the Irish National movement and was several times tried for sedition. In 1852 he was elected to Parliament, but he resigned in 1856 and went to Australia. Here he held important offices, including that of premier of Victoria. From 1880 until his death he lived at Nice.

**Dugong'**, a native mammal of the Indian seas, resembling the whale in some respects. It has a tapering body, ending in a crescent-shaped, fin-like tail, and is said sometimes to attain a length of twenty feet, though generally it is about seven or eight feet long. The thick and smooth skin is bluish above and white on the lower parts and bears a few scattered bristles. The dugong's food consists of marine plants, which it finds in the mouths of large rivers. It yields little or no oil, but it is hunted by the Malays for its flesh, which resembles young beef and is tender and palatable. (See illustration on next page.)

**Du Guesclin**, *du ga klaN'*, BERTRAND (about 1320-1380), constable of France. To him is due much of the credit for the expulsion of the English from Normandy, Guienne and Poitou.

**Duisburg**, *doo'is burg*, a flourishing town in Rhenish Prussia, 13 mi. n. of Düsseldorf. It is an ancient place, believed to be of Roman origin. It early rose to be a free town and became a member of the Hanseatic League. It possesses a beautiful church of the fifteenth century, and has iron manufactories, engineering works, chemical works and cotton and woolen mills. It also is the seat of a large trade. Population in 1910, 229,478.

**Dulcimer**, *dul'sim mur*, one of the most ancient musical instruments, used in almost all parts of the world. The modern instrument consists of a shallow trapezium-shaped box without a top, across which runs a series of

## Duluth

wires, tuned by pegs at the sides and played on by being struck by two cork-headed hammers. It is interesting chiefly as being the prototype of the piano. The Hebrew psaltery is supposed to have been a variety of the dulcimer.

**Duluth**, *du looth'*, MINN., the county-seat of Saint Louis co., about 155 mi. n. w. of Saint Paul and Minneapolis, at the west end of Lake Superior, on the Chicago & Northwestern, the Northern Pacific, the Great Northern and several other railroads. The city is beautified by about 400 acres of parks, including Central, Chester, Lincoln, Fairmount, Lester and several smaller parks, and 20 miles of boulevards. Lake View Terrace, running 7 miles along the bluff, some 500 feet above the lake, is an especially fine drive and commands one of the most beautiful of views. The Central High School is one of the finest public school buildings in the country, and the Duluth State Normal School also has good quarters. Other important structures are a Carnegie Library, the Federal buildings, the board of trade, the Spalding and Saint Louis hotels, the Wolvin building, the Masonic Temple, the Y. M. C. A and the Y. W. C. A. buildings and the Lyceum theater.

Duluth is situated on one of the finest natural harbors in the world. This bay is 9 miles long and 2 miles wide, and is separated from the main body of the lake by a narrow strip of land 7 miles in length, known as Minnesota Point. A ship canal which crosses the Point is spanned by an aerial bridge, the only one of its kind in the United States. (See illustration under BRIDGE.) The location at the western end of the Great Lakes makes Duluth the natural out-



DUGONG

let to the northwest, and it ranks as one of the chief commercial ports of the country. It is the terminus for about a dozen steamship lines, has docks which are among the largest in the world, and enormous grain elevators. Millions of tons of ore are shipped from the city each year. There are quarries of sandstone, granite and

## Dumas

slate in the neighborhood, and the fisheries are also important. The principal industrial establishments include blast furnaces, iron and steel plants, foundries, machine shops and flour and lumber mills.

The first European known to have visited the site where Duluth now stands was a French trader, Daniel Greysolon, Sieur Du Lhut, who in 1678 built a trading post on the north shore of Superior Bay. The first permanent settlement was made in 1853, and was named for the early explorer. Until 1880, growth was very slow, but in the ten years succeeding that date it was phenomenal. Duluth was incorporated as a town in 1867 and as a city three years later. Population in 1910, 78,466.

**Duma** or **Douma**, the name given to the lower branch of the Russian parliament, ordained by a manifesto of August 19, 1905. It is also called the National Assembly. The members of the Duma are elected by the Zemstvos, are about 500 in number and are entrusted, together with the Council of the Empire, with the legislative power in Russia. Bills passed by both the Council and the Assembly become laws when approved by the emperor. A bill vetoed by the emperor cannot be reintroduced at the same session. A bill defeated by one of the legislative bodies requires the consent of the emperor to be reintroduced. There are important restrictions upon the power of the Duma. It cannot discuss the reports of the minister of finance; it cannot discuss charges of malfeasance against officers of the government or members of the Council; it cannot consider questions relating to titles of nobility or entailed estates. All of these questions are to be determined by the Council of the Empire (see RUSSIA, subheads *History* and *Government*). The ministers have more legislative power than does the regular legislative body, for while any member of the Duma may propose a law, this cannot be presented to the house until it has received the approval of the minister of the department concerned. When the Duma is not in session the emperor may issue edicts which have the force of laws, but which may be set aside by the legislature at its next session.

**Dumas**, *du mah'*, ALEXANDER (1802-1870), a French novelist and dramatist. He was the grandson of the Marquis de la Paillette and a negress, from whom was taken the name Dumas, and from whom he inherited many characteristics, both physical and mental. In 1823 he took up his residence in Paris and



## Dumas

obtained an assistant secretaryship from the duke of Orleans, afterward Louis Philippe. He soon began to write for the stage and in 1829 scored his first success with the drama *Henry III*. The same year appeared his *Christine*, and other dramas followed in rapid succession. He then turned his attention to romance, with the definite purpose of writing a series of novels which should deal with the whole course of French history, and the result was his remarkable list of historical romances, of which the best-known are *Three Musketeers* and its con-



ALEXANDER DUMAS

tinuations, *Twenty Years After* and the *Vicomte de Bragelonne*. *The Count of Monte Cristo*, *The Black Tulip* and several others are also well known to English readers, through translations.

The works which bear Dumas's name amount to almost three hundred volumes, but the only claim which he could lay to many of the productions issued under his name was that he had either sketched the plots or revised them before they went to press. He earned vast sums of money, but his recklessness and extravagance reduced him to a shifty, scheming mode of living. For many years he wandered about Europe, until at length he was taken to live with his son, whom he had neglected in his childhood and had led into much recklessness and dissipation in his young manhood. He died at the home of his son.

**Dumas**, ALEXANDER (1824-1895), a French dramatist, son of the novelist of the same name.

## Dumfries

His literary career began with the publication, in 1848, of a novel, *La dame aux camélias* (*Camille*), which was presented four years later in the dramatized form in which it has been so popular. All of his dramas deal satirically with the follies and vices of French society and present forceful arguments for social purity.

**Du Maurier**, *du mo rya'*, GEORGE LOUIS PALMELLA RUSSON (1834-1896), a British artist, caricaturist and novelist, born in Paris. He was a naturalized British subject, having gone to England in 1851. At first he studied chemistry, but soon adopted art as a profession. After studying in Belgium and France he began to draw for *Once a Week*, *The Cornhill Magazine* and *Punch*. He contributed to Harper's Magazine many illustrations, besides three novels: *Trilby*, on which his fame chiefly rests, *Peter Ibbetson* and *Martian*.

**Dumbarton**, *dum bahr't'n*, a seaport in Scotland, capital of Dumbarton co., on the Leven, near its confluence with the Clyde, 13 mi. n. w. of Glasgow. Shipbuilding is carried on to a great extent and there are foundries and engine works. A little to the south is the famous rock and castle of Dumbarton, rising above the Clyde. The castle stands on a steep, rugged rock, rising to the height of 560 feet. It is one of the four Scotch castles which were stipulated to be kept in repair by the terms of the treaty of union between England and Scotland (See SCOTLAND, subhead *History*). There has been a stronghold here from the earliest times, and the fortress of Dumbarton occupied an important place in Scottish history. It was once the prison of the hero Sir William Wallace, and it was also the residence of Mary Queen of Scots before she went to France. Population of town in 1911, 22,000.

**Dumb-bells**, weights usually in the form of two iron balls connected by a straight piece or handle. They are used in gymnastic exercises for strengthening the muscles of the arms and chest. The dumb-bells in ordinary use weigh from one to five pounds each, though much heavier ones are used in trials of strength.

**Dumfries**, *dum'frees*, a town of Scotland, capital of the county of the same name, on the Nith, 9 mi. from its mouth in the Solway Firth and 73 mi. s. of Edinburgh. There are iron foundries, hosiery and tweed factories, tanneries and coach-building works. The Greyfriar's Monastery, which once stood here, was the scene of the murder of the Red Comyn by Bruce in 1306. Burns spent his closing years

here. His remains rest under a handsome mausoleum, and a statue of him was erected in 1882. Dumfries became a royal burgh in the twelfth century, in the reign of William the Lion. Population in 1911, 16,100.

**Dumouriez**, *du moo're ay'*, CHARLES FRANCOIS (1739-1823), a French general and politician. He served as an officer in the Seven Years' War, and in 1768 he went to Corsica as quartermaster general of the small army which was sent for the conquest of that island. During the latter part of Louis XV's reign, Dumouriez fell into disgrace and was thrown into the Bastille, but with the accession of Louis XVI he was restored to favor and was appointed governor of Cherbourg. At the outbreak of the Revolution he joined the Jacobins, and subsequently the Girondists, and in 1792 he was minister of foreign affairs. War breaking out between France and Austria, he resigned in order to take command of the army; he invaded Flanders, defeated the Austrians at Jemappes and conquered Belgium. Instead of prosecuting the war vigorously he now entered upon measures for the overthrow of the revolutionary government and the restoration of the constitutional monarchy. Summoned to trial as a traitor, he deserted to the Austrians, and the convention set a price of 300,000 livres upon his head. After various wanderings he found a final refuge in England. He was the author of *Memoires* and of a large number of political pamphlets.

**Du'na** or **Southern Dvina**, a river of Russia, rising near the sources of the Volga. It is over 600 miles long and is navigable for nearly its whole course, but is frozen for about four months each year.

**Dü'naburg**, in Russian, Dvinsk, a fortified town of Russia, in the government of Vitebsk, on the right bank of the Düna, 112 mi. s. e. from Riga. It has various industries and a considerable commerce. It is a great depot for the Russian artillery. Population in 1910, 110,354.

**Dun'bar**, PAUL LAURENCE (1872-1906), a negro poet, born in Dayton, Ohio, where he graduated at the High School and for some time served as an elevator boy. He worked at journalism in New York, and after 1898, the year of his marriage, he was on the staff of the Congressional Library. He gave frequent readings from his own works, which include *Poems of Cabin and Field*; *The Fanatics*, a novel; *Candle-Lightin' Time*, poems, and *Lyrics of Love and Laughter*. Mr. Dunbar usually wrote in dialect and portrayed, with perhaps the first

high poetic genius shown by his race, the actual humor and pathos of Southern negro life.

**Dunbar**, WILLIAM (about 1465-about 1525), the most eminent of old Scottish poets. On the marriage of James IV to Margaret of England, Dunbar celebrated the event in a poem of great beauty, entitled *The Thistle and the Rose*. His works consist of elaborate allegories, satirical and grimly humorous pieces and poems full of brilliant description and coloring.

**Dunciad**, *dun'si ad*, **THE**, a celebrated satirical poem by Pope, in which he ridicules his critics and foes. The first three books were published in 1728; the fourth book, or *New Dunciad*, appeared in 1742. In this latter part Colley Cibber was substituted for Theobald as the hero.

**Dundee'**, a city of Scotland, in the County of Forfar, on the north shore of the Firth of Tay, about 8 mi. from the open sea, 37 mi. n. n. e. of Edinburgh. The chief educational institution is the University College, which opened in 1883. Here is a remarkable tower 156 feet high, built in the twelfth century. The town has long been celebrated for its textile manufactures, particularly those of the coarse linens, and it is now the chief seat of the linen trade in Scotland and of the jute trade in Great Britain. Shipbuilding is extensively carried on, and there are large engineering establishments. Another branch of business is the northern seal and whale fishery. Dundee was made a royal burgh in the twelfth century by William the Lion. It held an important place in the medieval history of Scotland. Population in 1911, 165,006.

**Dundon'ald**, **EARL**. See COCHRANE, THOMAS.

**Dune**, a hill formed by drifting sand. Strong winds drive sand and soil through the air very much as they drive snow. When the sand meets an obstacle like a bowlder or log, some of it is lodged. Thus a small mound is formed, which, as it grows, continues to stop more sand. In this way low hills are formed along the coasts in sandy regions, and sometimes on the plains, where the surface contains either loose sand or soil. The height of these dunes varies from 40 to 200 feet. They are quite common along the Atlantic coast, among the cliffs in England and around the southern end of Lake Michigan, a region which, on account of these peculiar formations, is of special interest to geographers. See GEOLOGY; WIND.



## Dunedin

**Dune'din**, capital of the provincial district of Otago, New Zealand, at the head of Otago Harbor, the most important commercial town in the colony. Though founded in 1848, its more rapid progress dates only from 1861, when extensive gold fields were discovered in Otago. There are many handsome buildings, both public and private, among them being the municipal buildings, the postoffice, the government offices, the university, the new museum and the Athenaeum. Several woolen and other manufacturing are now in existence, and the chief articles of export are wool, grain and potatoes. There is a regular line of steamers between this port and Melbourne, and communication is frequent with all parts of New Zealand. Population in 1911, 41,529; with suburbs 64,237.

**Dunfermline**, *dun fur'lin*, a royal burgh and city of Scotland, in the County of Fife, 3 mi. n. of the Firth of Forth and 16 mi. n. w. of Edinburgh. Dunfermline was early a favorite residence of the kings of Scotland, and here were born David II, James I, Charles I and his sister Elizabeth. The Benedictine abbey, founded by Malcolm Canmore in 1070, is now represented chiefly by the Abbey Church, underneath the pulpit of which are the remains of King Robert Bruce (See BRUCE, ROBERT). Dunfermline early took the lead in the manufacture of table linen, and it is still unrivaled by any other town in the kingdom. There are large collieries in the neighborhood. Population in 1911, 28,100.

**Dun'kers**, **Dun'kards** or **Tun'kers**, a religious sect founded in Schwartzenau, Germany, in 1708. It takes its name from the German *tunken*, to dip, from the mode of baptizing converts. Between 1719 and 1729, because of persecution nearly all members of this sect came to the United States and settled in Pennsylvania. They are now found in Ohio, Indiana, Illinois, Iowa and some of the southwestern states. In 1905 the total number of members was 114,194, with 1125 churches. They wear a plain and uniform dress, take no part in politics, take no oaths, avoid law suits and war, denounce divorce, abstain from the use of alcoholic drinks and discourage the use of tobacco.

**Dun'kirk**, a seaport town of France, in the Department of Nord, at the entrance of the Strait of Dover. It is surrounded by walls and is defended by forts and outworks. It has several fine churches, a college, a public library and a gallery of paintings. The manufactures

## Duns

consist of earthenware, leather, soap, starch and ropes, and there are sugar refineries, breweries and ship-building yards. Population in 1911, 38,891.

**Dunkirk**, N. Y., a city in Chautauqua co. 48 mi. s. w. of Buffalo, on Lake Erie and on the New York Central, the Erie, the Lake Shore & Michigan Southern and other railroads. There is a good harbor and a large lake trade, and the industries include locomotive works, foundries, planing mills and shirt factories. The city contains several parks and is a popular summer resort. Other features of interest are the Brooks Memorial Library and the Brooks Memorial Hospital. Population in 1910, 17,221.

**Dun'more**, PA., a borough in Lackawanna co., 2 mi. n. e. of Scranton, on the Erie and the Lackawanna railroads. It is the seat of several public institutions, of which the State Oral School for Deaf and Dumb is the most important. Dunmore is in the anthracite coal fields and also has manufactures of brass, iron and silk. It was settled in 1835 and was incorporated in 1862. Population in 1910, 17,615.

**Dunmore**, JOHN MURRAY, Earl (1732-1809), a colonial governor in America. He was made a peer in 1756, became governor of New York in 1770 and of Virginia in 1771. He resolutely opposed the tendencies of the colonists to resist the British government, dissolved their assembly several times and frequently came into armed collision with them. He returned to England in 1776, and in 1787 he was appointed governor of the Bahama Islands.

**Dunne**, FINLEY PETER (1867- ), an American journalist and humorist, born in Chicago. After obtaining a common school education, he went into newspaper work. He has become famous through his creation of one *Mr. Dooley*, a publican of Archey Road, who converses on political and social topics with his friend *Mr. Hennesey*. *Mr. Dooley in Peace and War*, his first volume of selections, obtained a wide circulation both in America and England. Several succeeding volumes have also been justly popular.

**Duns**, JOHN (1265-1308), commonly called Duns Scotus, an eminent scholastic divine. Little is known of his history. He was the apostle of realism, which was opposed to nominalism. Duns claimed that theology rests on a practical faith, an act of the will, and that "will is the mover in the whole kingdom of mind. and all things are subject to it." He

defended the doctrine of the Immaculate Conception against the Dominicans, a doctrine which has since been declared (1854) a necessary part of Catholic faith. Duns's chief works consist of commentaries on Aristotle, on the Bible and on the *Sentences* of Peter Lombard.

**Dun'stan**, SAINT (925-988), an Anglo-Saxon divine and statesman. He entered the Benedictine order, became an anchorite at Glastonbury and in 945 was made abbot by King Edmund. After the death of Edmund, Edred, the next king, made him his prime minister and principal director in civil and ecclesiastical affairs. In the reign of Edwy he was banished, but was recalled by Edgar and was made archbishop of Canterbury. Dunstan's counsels helped to make Edgar's reign a peaceful one. He was again deprived of power on the accession of Ethelred in 978 and devoted the last years of his life to his diocese and to the literary and artistic pursuits of his earlier days.

**Dupleix**, *du pla'*, JOSEPH FRANCOIS, Marquis (1697-1764), the most famous of the French governor generals in India. He first went to India in 1720 as a member of the superior council, and within the next twenty years he had fully proved his ability to cope with the difficult problems in India. In 1843 he was made general commandant of the French possessions there, and had he been well supported by the French government or the French East India Company he might have been able to establish firmly French rule. During the War of the Austrian Succession, the French and English came into conflict in India, and although the French were at first successful, they were compelled by the Treaty of Aix-la-Chapelle to restore to England Madras, which they had captured early in the struggle. Dupleix continued his ambitious plans after peace was restored, but the inadequate support which was given him allowed Clive gradually to gain the upper hand in India. Dupleix was recalled to France in 1754.

**Du Pont'**, SAMUEL FRANCIS (1803-1865), an American naval officer, born at Bergen Point, N. J. He was appointed a midshipman in the United States navy in 1815 and was promoted through various ranks, until he became commander in 1842. He served in the war with Mexico and was made captain in 1855. In 1861 he was in command of the navy yard in Philadelphia, and he equipped and organized the naval force for service in the Civil War. He himself was appointed flag officer and was given

the command of the South Atlantic squadron which captured Port Royal, S. C., Jacksonville, Fla., and a number of other places. In 1862 he was made a rear admiral, but in the following year, after his repulse at Charleston, he was relieved by Admiral Dahlgren and took no further part in the war. He was the author of a treatise on the use of floating batteries for coast defenses.

**Dup'pel**, a fortified village in the province of Schleswig-Holstein, Prussia, on the coast of the Little Belt. The place is of considerable strategic importance and has been the scene of some severe struggles between the Danes, to whom it formerly belonged, and the Germans. It was captured by the Prussians in 1864, after a siege and bombardment which lasted nearly two months.

**Dupre**, *du pra'*, JULES (1812-1889), a French landscape and marine painter, the son of a porcelain manufacturer. He studied designing in his father's establishment and then took up painting by himself. Among his first works were *Interior of a Forest*, *View of Isle Adam*, *Evening* and *Environs of Paris*. After these followed his famous *Farmyard*, and later, as a result of a trip to England, *Environs of Southampton*. His landscapes are bright with color, having glaring reds and brilliant effects of every variety, in striking contrast to those of Corot. Others of his works are *Moonlight*, *The Pasture* and *Mowing Clover*.

**Duquesne**, *doo kane'*, PA., a borough in Allegheny co., near McKeesport, on the Monongahela River and on the Pennsylvania railroad. It has a Carnegie library, an institute and extensive blast furnaces and steel works. The place was settled in 1885 and was made a borough in 1891. Population in 1910, 15,727.

**Durand'**, ASHER BROWN (1796-1886), an American painter and engraver, born in South Orange, N. J. His first great work was to engrave Trumbull's *Declaration of Independence*. In 1825 he produced *Musidora*, and in 1828, *General Jackson*. He made many plates for the annuals and engraved some heads for the National Portrait Gallery. In 1836 portraiture and landscape painting became his chosen occupations. Of portraits, he completed those of Jackson, John Quincy Adams, Bryant, Kent and others; of figure paintings he executed *Harvey Birch* and *Washington*, *The Wrath of Peter Stuyvesant* and *The Capture of Andre*. His best known landscapes are *The Catskills from Hillsdale*, *The Franconia Mountains* and *Mountain*



## Durango

*Forest.* He was one of the founders of the National Academy of Design, and from 1845 until 1861 he was its president.

**Durango**, *doo rah'n'go*, a town in Mexico, capital of the State of Durango, about 500 mi. n. w. of the city of Mexico, on an elevation 6845 feet above the sea. It is well built, has a cathedral, a mint and manufactures of cotton and woolen goods and leather. It is an important mining center and is in a rich agricultural region. Population in 1910, 34,085.

**Durant**, HENRY FOWLE (1822-1881), an American lawyer and philanthropist, born in Hanover, N. H. He graduated at Harvard in 1841 and afterward read law. In 1846 he was admitted to the bar and began practice in Boston. He retired from the practice of law in 1863, abandoned his real name, Henry Welles Smith, and made New York City his residence. He then became impressed with the necessity of higher education for women and endowed and founded Wellesley College.

**Durban**, the only seaport of Natal, and one of the most important ports in British South Africa. Among the public buildings are the town hall, a library and a theater. The harbor is very well protected and affords excellent accommodation. The port is situated at the terminus of two railway lines leading into Orange River and Transvaal colonies. Durban was founded in 1823 by the Dutch. Population in 1911, 72,512.

**Dürer**, ALBRECHT (1471-1528), a German painter, designer, sculptor and engraver on wood and metal. Before his visit to Venice in 1505, Dürer's work was stiff and angular, resembling the German school, but after this his art showed the influence of the Venetian painters and became more refined in composition and color. While in Italy he painted a large altarpiece for the chapel in San Bartolomeo. Maximilian I appointed him his court painter, and Charles V confirmed him in this office. He was very popular at court and with the common people. Luther, Melanchthon, Erasmus, Bellini and Raphael were among his friends. He invented the method of printing woodcuts with two colors. Among his masterpieces in painting are *Crucifixion*, *Adam and Eve*, an *Adoration of the Magi* and portraits of Raphael, Erasmus and Melanchthon. Among his best engravings on copper are his *Fortune*, *Melancholy*, *Adam and Eve in Paradise*, *Saint Hubert*, *Saint Jerome* and the so-called *Smaller Passion*.

**Du'ress**, in law, restraint or compulsion. It is of two kinds, *duress of imprisonment*, which is

## Dutch East Indies

imprisonment or restraint of personal liberty; and *duress per minas*, when a person is threatened with loss of life or with some injury. An act done under duress is voidable or excusable.

**Durham**, *dur'am*, N. C., the county-seat of Durham co., 26 mi. n. w. of Raleigh, on the Norfolk & Western, the Southern and other railroads. The city has extensive manufactures of cigars and cigarettes and contains one of the largest smoking-tobacco factories in the world. There are also cotton mills, fertilizer factories, foundries and other industries. It is the seat of Trinity College and has a school of fine art, a conservatory of music, a public library and Watts Hospital. Durham was settled in 1855. A Confederate army under General Johnston surrendered to General Sherman near here April 26, 1865. Population in 1910, 18,241.

**Duse**, *doo'za*, ELEONORA (1859- ), an Italian actress. Her first appearance, at thirteen years of age, made no distinct impression, and it was not until several years later that her remarkable talents were recognized. Gradually, however, she came to be acknowledged as one of the greatest actresses of her time. In her tours in Germany, America, England and France, she was received with the greatest enthusiasm, especially as Juliet, Marguerite and Francesca da Rimini. Several of D'Annunzio's plays have been written for her, and in these she has met with her greatest successes.

**Düs'seldorf**, a town of Prussia in the Rhenish province, situated on the right bank of the Rhine, 22 mi. n. n. w. of Cologne, one of the handsomest towns in the valley of the Rhine. The city is divided into four sections. It is a great focus of railway and steamboat communication and has a number of handsome public buildings and several remarkable churches. Among the public institutions, particular notice is due to the Academy of Art. Düsseldorf has the honor of having founded a school of painting, which takes the name of *Düsseldorf* and has had a large number of distinguished pupils. The Hofgarten is one of the finest public gardens in Germany. The industries embrace the manufacture of iron goods, cotton, leather, tobacco, carpets and chemicals, and the trade is large. Population in 1910, 357,702.

**Dutch East Indies**, a name given to the Dutch possessions in the Malay Archipelago, comprising Sumatra, Java, Madura, Riau Lingga, Billiton, Celebes, Moluccas, Bali and many minor islands, with parts of Borneo, Papua and Timor. The capital is Batavia.

The total area is estimated at 750,000 square miles, and the population is about 36,000,000.

**Dutch Guiana**, *ge ah'nah*. See GUIANA.

**Dutch Metal**, an alloy containing  $84\frac{1}{2}$  parts copper and  $15\frac{1}{2}$  parts zinc. It has a fine golden-yellow color, is ductile, malleable and tenacious. When beaten out by a process analogous to that for gold leaf, until the sheets are less than 1-50,000th part of an inch thick, it constitutes Dutch leaf, or Dutch foil, and is used instead of gold leaf for ornamental purposes. See GOLD BEATING.

**Duties**. See TAX; CUSTOMS DUTIES; EXCISE TAX.

**Duyckinck**, *di'kink*, EVERT AUGUSTUS (1816-1878), an American editor, born in New York City. After graduation at Columbia, he studied law and was admitted to the bar in 1837. He traveled in Europe, and on his return he became joint editor of the magazine *Areturus*. From 1847 to 1853 he managed with his brother the *Literary World*, and later he published the *Cyclopaedia of American Literature*.

**Duyckinck**, GEORGE LONG (1823-1863), an American biographer, brother of Evert A. Duyckinck. He graduated at the University of New York and studied law, but found that his tendencies were all toward literature. With his brother he published the *Cyclopaedia of American Literature*, for which he is best known.

**Dvina**, *dve nah'*, a river of northern Russia, formed by the union of two small streams in the Government of Vologda. It flows in a north-westerly direction and falls by four mouths into the White Sea. At Archangel, before it divides, it is 4 miles broad. It is navigable as far as Suchona and is connected with the Volga by canal. The length of the river is 760 miles.

**Dvinsk**. See DÜNABURG.

**Dvorak**, *dvor'zhahk*, ANTONIN (1841-1904), a Bohemian musical composer, born in Mullhausen. He studied at the Prague Conservatoire and at Vienna and early began to compose works of large proportions. His best works, excepting the *Stabat Mater* and *Requiem Mass*, are those which deal with national Bohemian themes. From 1892 to 1895 he was director of the National Conservatory in New York. While in America he became interested in negro and indian melodies, and the finest expressions of these are to be found in his works. With Smetana he leads the Bohemian school of musicians.

**Dwarf**, a term applied to any animal or plant greatly below the usual size of its kind, particularly to an unusually small human being. Ac-

counts of dwarf tribes in Africa have been common from early times, and it would appear from the accounts of Du Chaillu, Schweinfurth and other travelers that there are several dwarfish tribes throughout that continent. Chief among these are the Akka dwarfs of Central Africa; and a race is said to exist in the Kongo State, not as a distinct community, but mixed with other tribes. Individual dwarfs occur in all races and were formerly a fashionable appendage to the courts of princes and the families of nobles. Jeffery Hudson, the favorite dwarf of Charles I, at the age of thirty is said to have been only eighteen inches high, though he afterward grew to three feet nine inches. Bébé, the celebrated dwarf of Stanislas of Poland, was thirty-three inches; Wybrand Lolkes, a Dutch dwarf, when sixty years of age was only twenty-seven inches; Francis Flynn—"General Mite"—was only twenty-one inches at sixteen. The best-known dwarf of modern times was Charles H. Stratton—"General Tom Thumb"—who at the age of twenty-five was thirty-one inches in height. Unlike giants, dwarfs usually show no signs of mental weakness and are often, on the contrary, exceptionally bright. They are in many cases, too, perfectly proportioned; but some physical abnormality usually accompanies dwarfism.

**Dwarfing**, the process of training up trees or shrubs for ornament in houses, so as to cause them never to reach more than a very small size, by keeping them in poor soil, giving them little water and pinching off strong shoots. Formerly dwarfing was practiced only by the Chinese and Japanese, for producing ornamental shrubs, but it is now common among fruit growers and on coffee plantations. Fruit trees are often dwarfed by grafting the cion upon a slow-growing trunk. Coffee trees are kept trimmed to increase the number of small branches upon which the fruit is borne. See GRAFTING.

**Dwight**, *dwite*, THEODORE (1764-1846), an American journalist, born at Northampton, Mass. He studied law, was admitted to the bar and became engaged in many political controversies as a pronounced Federalist. After serving in the state senate, he was elected to Congress in 1806. He edited various papers in Hartford, Albany and New York and published a *History of the Hartford Convention* and the *Character of Thomas Jefferson as Exhibited in his own Writings*.

**Dwight**, TIMOTHY (1752-1817), an American divine, born in Massachusetts. His father was



Col. Timothy Dwight, and his mother a daughter of Jonathan Edwards. He served as chaplain in the Revolutionary army and ultimately became president of Yale College. His *Theology* (1818) was for long a standard, both in Britain and in America. He was also the author of two poems the *Conquest of Canaan* and *Greenfield Hill*, besides numerous unimportant works, consisting of dissertations and occasional sermons. A grandson, Timothy Dwight, was elected president of Yale in 1886 and was a member of the American committee for the revision of the English version of the Bible.

**Dyaks**, the aborigines of Borneo, chiefly inhabiting the interior of the island. They are a finely formed race, of a yellow complexion, and are described as docile, industrious and superior to the Malays, exceeding them in stature and often in good looks. The more advanced of them practice agriculture and dwell in neatly constructed and tolerably comfortable houses. Hunting their enemies to make trophies of their heads is practiced among them, but it has been abolished where European influence prevails.

**Dyeing**, *di'ing*, the art of fixing a new and permanent color on textile fabrics, usually cotton, linen, silk and wool. All fabrics must be thoroughly cleaned before placing them in the dye. Cotton and linen fabrics go through a prolonged series of operations in bleaching (See BLEACHING). Silk is boiled in a solution of fine soap to remove the fatty matter, and wool is cleansed by scouring in weak soap or soda lye or weak ammonia.

The process of dyeing varies much according to the stuff and the coloring matters used. In general, animal fibers, like silk and wool, combine more easily with most colors than vegetable fibers, such as linen and cotton. In the case of the former, for example, a simple immersion in aniline dyes is sufficient to produce a fixed color. Some dyes will not unite directly with the fibers so as to produce a good and permanent color. These dyes require the intervention of another agent to fix them on the different stuffs, and the name *mordant* is applied to those substances which are employed to make the stuff to be dyed and the dyeing color combine. Alum, acetate of alumina, chloride of tin, salts of iron, albumen, gluten and tannin are common mordants. The mordant is generally dissolved in water, into which the stuffs to be dyed are plunged. In some cases it is mixed with the color, and both are applied to the stuff at the same time. An important

characteristic of mordants is their power of affecting the natural tint of the dye and thus enabling a variety of shades to be produced at small expense. Thus, nitrates tend to give a yellow tinge to the colors; alumina deepens and oxide of tin brightens the natural tints. See CALICO PRINTING.

**Dy'er's Weed**, a plant of the same genus as mignonette, otherwise called yellow weed, weld or woad. This plant affords a beautiful yellow dye and is cultivated for that purpose. It grows in waste places and has become naturalized to some extent in the United States.

**Dynam'ics**, that branch of physics which deals with the laws of force. Dynamics is usually divided into *statics*, which treats of force when motion is not produced, and *kinetics*, which treats of forces that produce motion. All forces are so nearly alike in their effect as to be subject to the same laws and principles. They can also be estimated by common measure. Owing to the two systems of measure in general use, the English and the metric, there are two units by which force is measured. These are the *poundal*, used with the English system of weights and measures, and the *dyne*, used with the metric system (See DYNE; POUNDAL). Force is measured by its effect upon mass, the term which indicates the amount of matter per unit of space. The resistance which a body offers to force is directly proportional to its mass, and the relation of an impressed force and a body free to move with no other resistance than its inertia, is generally expressed in the following law, which is considered a maxim in physics:

"The velocity produced in a body free to move without resistance in a unit of time will be directly proportional to the intensity or amount of the impressed force and inversely proportional to the mass of the body."

The science of dynamics is founded almost entirely on three principles, known as Newton's Laws of Motion. These are:

(1) A body at rest remains at rest, and a body in motion moves with a uniform velocity in a straight line, unless acted upon by some external force.

(2) A given force will produce the same effect, whether acting upon a body in motion or at rest, whether the body is acted upon by that force alone or by others at the same time.

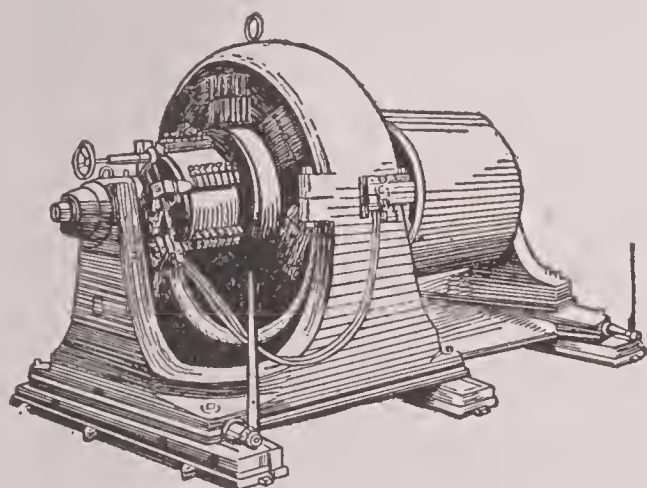
(3) The action of every force is accompanied by an equal reaction in the opposite direction.

**Dy'namite**, an explosive substance, made by soaking porous clay, wood fiber or rotten

## Dynamo

stone in nitroglycerine. The most explosive variety is made by dissolving guncotton in nitroglycerine and saturating wood pulp with the mixture. This variety is put up in cartridges, in the form of sticks eight inches long and one and one-half inches in diameter. Dynamite is used under various names, such as giant powder, rend-rock and Hercules powder. It is employed in blasting. See **BLASTING**; **NITROGLYCERINE**.

**Dy'namo** or **Dynamo Electric Machine**, a machine for generating electricity by mechanical action. The necessary parts of a dynamo are the *field magnet*, the *armature* and the *commutator*. The principle upon which the dynamo works is that magnetism can be generated by electricity, and that electricity also induces magnetism (See **ELECTRO-MAGNETISM**). The field magnet is either a permanent steel magnet or an electro-magnet, but in most machines the electro-magnet is used. Either the magnet or the armature revolves, according



DYNAMO

to the pattern of the machine. The current is reversed by the rotation of the commutator. Since the revolution is very rapid, a large number of reversals occur in a minute, thus producing a very strong current. Metal brushes in the form of springs are connected with the machine, so that the current is conducted over wires to the point where it is desired for use. The commutator consists of a series of brass or copper segments, insulated from one another

## Dysodile

at the axes and connected with the coils of the armature. This serves to reverse the current every time a segment of it comes in contact with the brush.

There are numerous patterns of dynamos, each of which is adapted to some special line of work. The simplest form has but two poles and is called *bi-polar*, but the larger dynamos have as many poles as they are able to contain magnets and are known as *multi-polar*. The large machines are used in generating currents for electric lights or electric railways and for furnishing power to electric motors in factories. The most acceptable pattern of dynamo is one in which the generating apparatus is attached directly to the shafting operated by the engine or water wheel, and this pattern is in general use in nearly all of the large electric plants. The largest dynamos in the world are found at Niagara Falls and are attached directly to the water wheels which furnish the motive power.

**Dy'natom'eter**, any instrument for measuring the relative strength of men or animals or the force of machinery. Commonly it consists of a spiral spring, similar to that in the spring balance, with a scale and indicator attached. When the pull upon a draught implement, as a plow for instance, is the point to be determined, the dynamometer is made a link in the draught chain, and the amount of extension or collapse which it suffers indicates the intensity of the strain.

**Dyne**, a unit of force, used when the metric system is employed for measuring force. In physics it is generally known as the unit of the centimeter-gram-second system. It is a force which, acting upon one gram of matter for one second, will give it a velocity of one centimeter per second. This is such a small unit that in practice a larger unit, called a megadync, is employed. This is equal to one million dynes. See **DYNAMICS**.

**Dysodile**, *dis'o dile*, a yellowish or greenish foliated mineral, found in limestone, with remains of fish and of plants, which, when ignited, burns and emits a bad smell. It is closely related to amber.





**E**, the second vowel and the fifth letter of the English alphabet. In form it is almost the same as in the earliest Greek. It occurs more frequently in English words than any other letter of the alphabet. In English its long or natural sound, as in *me*, coincides with the sound of *i* in the Italian and French languages. It has also another principal sound, a short one, heard in *met*, *men*. It has, besides, a sound like *a* in *bare*, as in *there*, and the obscure sound which is heard in *her*. As a final letter in English it is generally silent, but it serves to indicate that the preceding vowel is to have its long sound, as in *mane*, *cane*, *plume*. When two *e*'s come together the sound is generally the same as that of the single *e* long, as in *deem*, *esteem*, *need*.

In music, **E** is the third note in the diatonic scale of C.

**Eads**, *eedz*, JAMES BUCHANAN (1820-1887), an American engineer, born at Lawrenceburg, Ind. At an early age he went to Saint Louis and became a clerk on a steamboat. By the time of the Civil War he had become famous as an authority on all matters relating to the navigation of the Mississippi and was asked by President Lincoln for his advice in regard to the practicability of a fleet of gunboats on the Mississippi and other western rivers. The fleet was built and these boats rendered valuable service to the government, and it was with them that Fort Henry was captured in 1862. Eads's next work of importance was the designing and constructing of the famous Eads Bridge over the Mississippi River, connecting Saint Louis and East Saint Louis. It is considered one of the finest bridges in the world. Following this was his construction of the jetties at the mouth of the Mississippi, by which the channel of the river was kept clear to a depth sufficient to permit the navigation of the largest ocean-going vessels. This was a new departure in American engineering and met with disfavor at first, but Mr. Eads's faith in his plan was so

great that he offered to build the jetties at his own expense upon the condition that should they be satisfactory he should receive a large sum for the work. Eads was a promoter of many improvements along the Mississippi River. He engaged in extensive engineering operations at home and abroad. He was the first American to receive the Albert medal, conferred by the British Society for the Encouragement of Arts, Manufactures and Commerce. See JETTY.

**Eagle**, *e'gl*, the general name for a great group of birds related to the falcons and hawks.



GOLDEN EAGLE

The eagle is popularly regarded as the noblest and most courageous of birds. It flies to a greater height than any other bird, and from this circumstance the ancients considered it as a messenger of Jove. The eagle was on the standard of the old Romans, and now appears in the national ensigns of the United States, Germany, Russia and other nations. While

## Eagle

the birds really have wonderful power of vision and of flight and are noble in appearance, the habits of most are those of thieves, and none of them have any apparent objection to eating dead and decaying flesh. Birds of the typical genus have long and powerful bills, the upper mandible curved sharply over the lower, have wings reaching to the tip of the tail and legs feathered to the toes. The *golden eagle* is common through Europe, Asia and northern Africa. It measures over six feet from tip to tip of the



HEAD AND FOOT OF BALD EAGLE

expanded wings, and three feet from the beak to the end of the tail. The body is brownish, the feathers of the head and neck pointed and of a golden hue. The national emblem of the United States is the *bald eagle*, one of the fishing eagles, which takes its name from the fact that in mature birds the head and neck are white. It is a handsome animal which has an air of great nobility, especially upon the wing. If left undisturbed, bald eagles will return to the same nest year after year. The eagle seems particularly fond of the dead fish which it finds

## Ear

along the shore, and is not averse to seizing the prey which smaller birds have captured. There are a number of other species of eagles, both large and small, found in different parts of the world, and some confusion exists in the use of the name. See HARPY and LAMMERGEIER.

**Eagle**, a gold coin of the United States, of the value of ten dollars. It was first coined in 1795. There are also half-eagles, quarter-eagles and double eagles, of proportionate values.

**Eagle**. The eagle first appears as a military standard among the Persians. It was one of the first military standards of the Romans, having been adopted in 104 B. C., as the chief emblem to be borne at the head of the legions. Eagles were sometimes of gold, but oftener of silver, and were carried on the top of a spear. The eagle of Russia to-day is double-headed, and is the national military symbol. The eagles of Prussia and of the United States are single-headed. That of the United States, the bald eagle with wings displayed, is the national emblem and was adopted in 1785.

**Eames**, *aimz*, EMMA (Emma Hayden Story) (1867– ), an American soprano singer, born in Shanghai, China. After her parents returned to America in 1872, her musical education was carefully guided. She studied in Boston and Paris and made her debut in 1889 as Juliette at the Grand Opera, Paris, after which she gained remarkable success in all parts of the world. She married Julian Story in London in 1891.

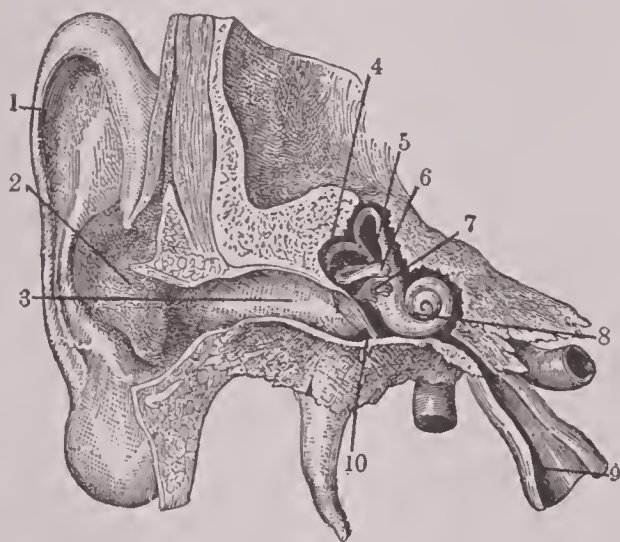
**Ear**, *eer*, the organ of hearing. In the lower orders of animals the ear is quite small and capable of perceiving only a few sounds, but it may be more acute than the human ear in recognizing these sounds. In man and all higher orders of animals the ear consists of three divisions, the external ear, the middle ear and the internal ear.

THE EXTERNAL EAR, or CONCHA, consists of the auricle, which is the part usually called the ear, and the auditory canal. In many animals the external ear is movable, but in man it is not. The human external ear consists of cartilage, skin and a thin, muscular coat and has a peculiar form. The outer rim is known as the *helix*, and the structure is so shaped as to attract sound waves into the auditory canal, which is a passage leading to the membrane separating the external from the middle ear. This is known as the membrane of the *tympanum* or eardrum, and is a circular membrane stretched across the inner end of the auditory canal, its rim being attached to the bone forming the walls of the tympanum.



The membrane contains a number of muscles, some of which are joined to the bones of the middle ear, and its inner surface is lined with a mucous membrane.

THE MIDDLE EAR or TYMPANUM is a cavity filled with air, which enters it through the Eustachian tube. It contains three small bones known as *ossicles*. From their peculiar shape these bones are called the *hammer*, the *anvil* and the *stirrup*. The hammer consists of a head, neck and handle, the last being attached to the eardrum. The anvil has a concave surface into which the head of the hammer fits, and the stirrup at one end is joined to the anvil, and at



SECTION THROUGH RIGHT EAR

1, helix; 2, concha; 3, outer passage; 4, 5, 6, semicircular canals; 7, oval window; 8, cochlea; 9, Eustachian tube; 10, eardrum.

the other to the vestibule of the internal ear. These bones are so placed as to transfer the vibrations of the eardrum to the internal ear.

THE INTERNAL EAR, or LABYRINTH, is located in a small cavity in the temporal bone, and is divided into the vestibule, the semicircular canals and the cochlea. The vestibule is a small triangular cavity between the semicircular canals and the cochlea. The base fits into the opening which connects this with the middle ear. The *semicircular canals* are three in number and occupy vertical, oblique and horizontal positions, as shown in the diagram. Each connects with the vestibule by two openings. The *cochlea* or *snail shell* is a gradually tapering canal winding two and one-half times around a central bony axis. The cavity of the cochlea is divided into two passages by a stiff spiral plate and a membrane composed of a large number of strings extending from the outer edge of the bony plate to the walls of the cavity. The internal ear is filled with fluid, within which floats a membrane

in shape and outline corresponding exactly to those of the bony cavity. Within this membrane is still another fluid, in which are found the sensory fibers of the auditory nerve and the *organ of Corti*. This consists of two rows of pillars or rods and extends the entire length of the cochlea. The number of rods is estimated at anywhere from 10,500 to 24,000, while the number of strings is 3000. These rods and strings are connected with the filaments of the auditory nerve. They are of different lengths and sizes and it is through them that the sound vibrations which enter the ear are reproduced.

HEARING. Hearing involves both physiological and mental action. For the production and transmission of sound, see SOUND. The external ear collects the sound waves and reflects them to the auditory canal, where they strike against the eardrum, which they cause to vibrate. By means of the bones in the middle ear the vibrations of the eardrum are intensified and at the same time transmitted to the internal ear at the vestibule. Here they set up vibrations in the fluid. The strings and rods in the organ of Corti, which can vibrate in harmony with these vibrations, respond just as do the strings of a piano that produce a note sung near the instrument. The vibrations in the organ of Corti stimulate the sensitive fibers of the auditory nerve connected with the vibrating rods, and the nerve impulses thus created are carried to the auditory centers of the brain, by which they are translated into sound. Hence, the final act of hearing is a mental act.

The muscles of the middle ear regulate the tension of the eardrum so that it can respond equally well to vibrations that produce high or low tones, and the large number of rods and pillars of the organ of Corti enable us to recognize a multitude of sounds.

**Early, ur'ly**, JUBAL ANDERSON (1816-1894), an officer in the Confederate army. He was born in Franklin co., Va., and graduated at West Point in 1837. He served in the Florida and Mexican wars, and after his adoption of the law as a profession, was a member of the state legislature and state's attorney. Although firmly opposed to secession, he held to his state and entered the Confederate army as colonel. At the first battle of Bull Run he was instrumental in saving the day for the Confederates, and he fought in the battles of Fredericksburg, Chancellorsville and Gettysburg. He also commanded in the Shenandoah Valley, where he was defeated by Sheridan. His lack of success

compelled General Lee to remove him from command, but many military critics place him next to Lee and Jackson among the Confederate soldiers.

**Ear'ring**, an ornament fastened to the ear, which is pierced for the purpose. Earrings are of very ancient origin, having been worn among the early Egyptians and Assyrians and also among the early Greeks and Romans. Among the earliest people they were regarded as a sign of rank, and were worn by kings, nobles, gods and genii. There was a great variety of design, the general form being a pendant in the shape of a cross, crescent or ring. The materials most used were gold and silver and pearls. Among the Greeks and Etruscans earrings were commonly worn by the women. The designs were very elaborate and beautiful, and the ornaments were prized for their workmanship. The Romans valued earrings according to the richness of the material, and cared less for artistic effect. The practice of wearing earrings is common to-day among peasant classes in Europe and among Oriental nations.

**Ear Shell.** See ABALONE.

**Earth**, *urth*, the planet which we inhabit, the third from the sun and the fifth in size. It is attended by one satellite. See MOON.

**SHAPE.** To an observer whose view is not obstructed, any part of the earth presents itself as a circular and horizontal expanse, on the circumference of which the heavens appear to rest. Accordingly, in remote antiquity the earth was regarded as a flat, circular body, floating on the water. But even in antiquity the spherical form of the earth began to be suspected. It is only on this supposition that we can explain why the horizon of vision grows wider and wider the higher the position we choose, why the tops of towers and mountains at a distance become visible before the bases, why the hull of a ship disappears first as she sails away, and why, as we go from the poles toward the equator, new stars become visible. Besides these proofs there are many others, such as the circular shadow of the earth seen on the moon during an eclipse, the gradual appearance and disappearance of the sun, and, lastly, the fact that since 1519 it has been regularly circumnavigated.

The earth is not, however, an exact sphere, but is very slightly flattened at the poles, so as to have the form known as an *oblate spheroid*. In this way the *polar diameter*, or diameter from pole to pole, is shorter than the diameter at right angles to this—the *equatorial diameter*.

The most accurate measurements make the polar diameter about 27 miles less than the equatorial, the equatorial diameter being found to be 7,925.6 miles, and the polar, 7,899.14.

**SURFACE LINES.** The earth is regarded as divided into halves—the northern and the southern hemisphere—by the *equator*, an imaginary line passing around it midway between the poles. In order to indicate with precision the position of places on the earth, additional lines are imagined to lie on the surface in such a manner that those of one set all pass through both poles, while those of the other are drawn parallel to the equator. The former are called *meridians*, the latter *parallels of latitude*, and by them we can tell the latitude and longitude, and thus the exact position of any place on the earth's surface.

**DENSITY.** Many experiments by various methods have been made in order to determine the average density of the earth, that is, the quantity of matter it contains, and from them it has been calculated that the density of the earth is about five and one-half times that of water.

**MOTIONS.** The earth, in common with the other planets, moves around the sun, completing its revolution in about  $365\frac{1}{4}$  days, our *common year*; or exactly 365 days, 9 hours, 9 minutes and  $9\frac{3}{10}$  seconds, making the *sidereal year*. The orbit of the earth is an ellipse, with the sun in one of its foci. Hence, the earth is not equally distant from the sun in all parts of the year, but is about 3,000,000 miles nearer at one time than at another, its least distance, according to recent calculations, being 89,897,000 miles, its greatest 92,963,000, and the mean distance, or half the length of the long axis of the orbit, 91,430,000 miles. From this it may be calculated that the velocity of the earth in its orbit is about 17 miles a second. In the winter of the northern hemisphere the earth is nearest the sun and in summer farthest from it; for the difference in the summer and winter temperature is not occasioned by the greater or less distance of the earth from the sun, but by the more or less oblique direction of the sun's rays. The passage of the earth around its orbit causes the sun to appear to describe a similar orbit in the heavens; and hence it is that at one time of the year one group of stars is seen in the neighborhood of the sun at sunrise and sunset and at another time another group. This apparent path of the sun is the *ecliptic*, and corresponds with what would be the path of the earth as seen from the sun; and the groups of stars through which the sun successively passed form the *zodiac*.



The earth's daily motion about its own axis takes place, according to mean time, in twenty-three hours, fifty-six minutes and four and one tenth seconds. The axis on which the earth performs its rotation is inclined towards the plane of its path about the sun at an angle of  $23\frac{1}{2}^{\circ}$  (which angle also represents that between the plane of the ecliptic and the plane of the earth's equator), the sun ascends in the heavens from March 21 to June 21 (the summer *solstice*), about  $23\frac{1}{2}^{\circ}$  above the equator toward the north pole, and descends again toward the equator from June 21 to September 23; it then sinks till December 21 (the winter *solstice*), about  $23\frac{1}{2}^{\circ}$  below the equator toward the south pole, and returns again to the equator by March 21. This arrangement is the cause of the seasons and of the inequality of day and night attending them. For all countries lying beyond the equator, day and night are equal only twice in the year (at the *equinoxes*). At the summer solstice the north pole of the earth is turned toward the sun, and the south pole away from it, and for  $23\frac{1}{2}^{\circ}$  about the north pole there is a period of longer or shorter duration during which the sun is continually above the horizon for more than twenty-four hours, while round the latter is an equal extent of surface within which the sun for similar periods is below the horizon. The reverse condition holds at the winter solstice. The circles bounding these regions are called respectively the *arctic* and the *antarctic* circle, and the regions themselves the *polar* or *frigid zones*. Throughout a region extending to  $23\frac{1}{2}^{\circ}$  on each side of the equator the sun is directly overhead at every point in succession twice in the year. The circles which bound this region are called the *tropics*, that in the northern hemisphere being the tropic of *Cancer*, that in the southern the tropic of *Capricorn*, while the region between is the *torrid zone*. The regions between the tropics and the polar circles are respectively the *north* and *south temperate zones*.

**SURFACE.** The surface of the earth contains over 196,000,000 square miles, of which scarcely a third part is dry land, the remaining two-thirds being water. The land is arranged into masses of irregular shape and size, the greatest connected mass being in the eastern hemisphere. The chief masses receive the name of continents, detached masses of smaller size forming islands. The surface of the land is variously diversified, exhibiting mountains, valleys, plains, plateaus and deserts. The water area of the earth is divided into oceans, seas, bays, gulfs and sounds,

while rivers and lakes may be regarded as features of the land surface. The great phenomena of the oceans are currents and tides.

**INTERIOR.** From the evidence furnished by volcanoes, hot springs and the sinking of mines, it is known that the earth has a high internal temperature of its own. Taking the average of the various observed rates of increase, this temperature seems to increase  $1^{\circ}$  F. for every sixty feet of descent. Assuming this to continue, the rocks at a depth of two miles would be as hot as boiling water, and at a depth of fifty miles the heat would be such as at the surface would melt every known solid. This being so, various theories as to the internal condition of the earth have been proposed: 1, That a thin envelope or crust surrounds a molten interior. It can be shown, however, that as tides must be produced in such a molten mass the cool outer crust would be unable to withstand the enormous force of these unless it were about 2,000 miles thick. 2, That the interior is solid, with spaces here and there filled with liquid or gaseous material. This theory assumes that there are within the earth enormous cavities filled with molten rock, which escapes, when local pressure is removed, in the form of volcanic outbursts. 3, That the earth consists of a thin crust, a large solid nucleus, and a liquid film between the nucleus and the crust; the temperature at the center being not much greater than comparatively near the surface. 4, That the earth is solid to the center, but any part may become liquid if local pressure is removed. We know that if the pressure on a solid be increased the melting point is correspondingly raised; now the pressure at the center of the earth, or even at the depth of fifty or one hundred miles, must be something enormous, and probably is so great as to keep the rocks there permanently in a solid condition, notwithstanding the heat. This last theory is considered the most probable. On the supposition of its correctness, volcanoes might be explained by supposing that at certain points here and there pressure is removed by the elevations of portions of the earth's surface which are constantly taking place, and that this allows the rocks to liquefy. Water may then soak down to these liquid rocks, and, being converted into steam, produce various volcanic phenomena.

The earth is believed to have condensed and solidified from a gaseous or nebular condition, and to have once had a far higher temperature than now. If such were the case the outer surface, losing heat by radiation, would be the first

## Earth Currents

part to cool quickly; while the interior, losing its heat by conduction, would not cool so rapidly, and therefore would naturally have a higher temperature than the portion at the surface. This is what all observations indicate the condition of the earth to be, and the shape of the earth also indicates that it must once have been in a fluid state.

**ATMOSPHERE.** The earth is surrounded by an atmosphere which moves with it and is really a part of it. Upon the surface of the earth proper this atmosphere presses with a force of 15 pounds to the square inch. The atmosphere has a thickness of from 50 to 60 miles, but it is so much denser below that half of its bulk is within  $2\frac{1}{2}$  miles of the surface.

**MAGNETISM.** Another feature that the earth as a whole presents is magnetism. When a magnetic needle is balanced on a point it remains at rest in one position only, pointing then nearly due north and south. This can be explained only on the supposition that the earth acts as a great magnet. It has, in fact, two poles—a north and a south magnetic pole—which are not very far from, but by no means coincident with, the geographical poles. The north magnetic pole was located exactly in 1905. There is also a neutral line or magnetic equator, which does not greatly diverge from the geographical equator. The earth acts upon all magnets as they act upon one another, and it is for this reason that they point north and south.

**Earth Cur'rents**, violent electrical disturbances of the nature of transient currents, which rush in one direction or another, and by which telegraphic lines, and particularly long submarine lines, are constantly troubled. The origin and nature of earth currents are not thoroughly understood, but they are found to be very intimately connected with the disturbances of terrestrial magnetism, called magnetic storms, and these, it is well known, are closely connected with the appearance of the aurora borealis and with the occurrence of the sun's spots. See **AURORA BOREALIS**.

**Earth'enware.** See **POTTERY**.

**Earth'nut**, a name given to the tubers of several very different plants, but particularly to those of a plant belonging to the parsley family. These tubers or nuts are about four or six inches below the surface, at the termination of a long, slender root. They are brown, the size of chestnuts, of a sweetish taste, resembling the common chestnut. Swine are very fond of the nuts, and fatten rapidly where they are

## Earthquake

abundant. In some localities peanuts are called carthnuts.

**Earth'quake**, a movement of the earth's crust, caused by some internal convulsion. Three kinds of earthquake movements are generally recognized. These are the wave movement, the vertical movement and the circular, or twisting, movement. The first is the most common and extends over the largest areas. The *wave* movement begins at a center, from which it moves in all directions, like a wave started by dropping a pebble into a pool of water. The earthquake wave, however, differs from the water wave in this: the irregular resistance which it receives from the different layers of rock prevents its moving in a circle, so that its outline soon becomes very irregular. The velocity is very great, often reaching thirty or forty miles a minute. These waves also move more rapidly in hard, elastic rock than in loose gravel or sand. The *vertical* movement acts like the explosion of a mine and usually throws masses of earth and rock into the air. The *circular* or *twisting* movement is the most destructive of all, but it is happily of least frequent occurrence and is confined to very small areas.

The causes of earthquakes are not well understood. Those in volcanic regions are evidently connected with volcanic action, and some are known to be caused by the eruptions which they precede; but those movements more or less remote from volcanic regions and extending over comparatively large areas, such as the earthquake at Charleston, S. C., in 1886, cannot logically be accounted for in this way. The most generally accepted view as to the cause of this sort of earthquake is that the movement of the earth's crust is caused by the contractions of cooling matter in the interior.

When the motion is violent and rapid, the destructive effects of an earthquake are very great. An upward movement of a quarter of an inch will crack brick walls, and one of half an inch will shatter them. When occurring on or near the seacoast, earthquakes often cause great destruction and loss of life by the unusually high waves which they produce in the sea. These roll inland and flood regions that under ordinary conditions are entirely free from the action of the sea. Sometimes large steamers are carried from their moorings and left upon dry land, buildings are destroyed, basins are flooded and hundreds of people are drowned. In some localities changes of level are produced by earthquakes, courses of streams are altered, springs



are dried up and new springs are formed. Fortunately, most shocks are mild, and those of a severe nature seldom occur. The most noted earthquake in the world's history are those at Lima in 1746; Lisbon in 1755, which caused the death of from 40,000 to 50,000 persons; Calabria in 1857; in Ecuador and Peru in 1868; at Charleston, S. C., in 1886; in Italy in 1887, and in Japan in 1891.

The most destructive earthquake in the United States occurred in San Francisco and its immediate vicinity April 18, 1906. A large portion of the business part of the city was destroyed or so damaged as to make rebuilding necessary. The destructive effects extended for 125 miles north and 80 miles south of the city. Several buildings of the Leland Stanford University were damaged or destroyed. The total loss of life was about 500, and over 1500 people were injured. The total property loss was estimated at \$350,000,000. On August 16, 1906, several shocks occurred in South America. Valparaiso, Chili, suffered serious damage and loss of life. Santiago and other towns in the vicinity were also more or less affected.

The greatest earthquake calamity known to history occurred in Calabria, Italy, and the island of Sicily on the morning of December 28, 1908. The cities of Messina, with a population of 100,000, and Reggio, with a population of 50,000, were destroyed, together with twenty or more smaller towns along the coasts of Calabria and Sicily. The loss of life was estimated at from 120,000 to 150,000. The nations of Europe and the United States were prompt in their responses for relief, the Congress of the United States appropriating \$800,000 from the national treasury. This was supplemented by private donations, and over \$3,000,000 was contributed from this country. The cause of this earthquake is supposed to have been a landslide or fault break (see FAULT).

On January 13, 1914, occurred another great earthquake on the island of Sakura, Japan. A volcano which had been inactive for 150 years suddenly burst into activity, wiping out three towns and killing hundreds of people.

**Earths**, a term applied to certain tasteless, inodorous, dry, unflammable, insoluble substances, of a moderate specific gravity, which constitute by far the greatest part of the gravel and soil that go to make up the mountains, valleys and plains of our globe. They include lime, baryta, strontia, magnesia, alumina and a few others. For a description of the substances named, see their respective titles.

**Earth Shine**, in astronomy a name given to the faint light visible on the part of the moon not illuminated by the sun. It is most conspicuous when the illuminated part of the disc is at its smallest, as soon after new moon. This phenomenon is popularly described as "the old moon in the new moon's arms" and is due to the light reflected from the earth upon the moon.

**Earthworm** or **Angleworm**, the popular name for long, cylindrical animals composed of many segments or rings, all of which are much alike. Earthworms move by contractions of successive parts of the body, aided by a double row of bristles on the under side. Their food consists of both vegetable and animal matter, and with it they swallow considerable soil. After digesting the food, they come to the surface of the earth and deposit the refuse and the soil in little heaps, thus by turning the earth over and over, and by bringing fine rich soil to the surface, they are of great service to the farmer. When a heavy rain comes it fills the burrows and forces the worms to come to the surface. Ignorant people then think the worms have rained down.

**Ear'wig**, a name given in the United States to small centipedes, but more properly applied to the group of insects having leathery upper wings, gauze-like lower wings and long, delicate antennae, and armed on the abdomen with strong pinchers.

**Easement**, *eez'-ment*, a right of use or enjoyment of lands belonging to another which one may possess through ownership or possession

of other lands. Such are rights of way, the right of light, the right of drainage. Common law classifies easements as *positive*, or *affirmative*, and *negative*. The former refers to the right of physical use of another's land, as a right of way, while the latter requires no such physical use, as the right of light. If an easement is infringed or destroyed, the responsible party is guilty of a nuisance, and this may be



EARWIG

a, larva; b, pupa; c, perfect insect.

abated by legal action or by the act of the person injured. If the offense does not amount to a nuisance, the offending party may be punished for trespass, while if the infringement is only threatened, an injunction may be issued to restrain the acts. Easements may arise either by *grant*, by *prescription*, that is, by immemorial usage, or by *implication*. The last-named arises from the natural presumption that the parties intend to convey such an easement at the time that the land is conveyed. Such an easement would be what is known as a *way of necessity*, that is, the right of ingress and egress to lands that are shut off on all sides.

**East'er**, the festival commemorating the resurrection of Christ, observed in many branches of the Christian Church. By the first Christians it was considered to continue the feast of the *Passover*, at which the paschal lamb, a symbol of Christ, was sacrificed. Hence, its name in Greek, French and other Romance languages is taken from the Hebrew *pesach*, passover. The English name comes from the Anglo-Saxon *Eostre*, a goddess of light or spring, whose festival was celebrated in April. There was a long dispute in the Christian Church as to the proper time for holding Easter, the Christians of the East celebrating it on the same day as that on which the Jewish Passover fell, that is, the fourteenth of Nisan, while the majority of the Church celebrated it on the Sunday next after this day. The controversy was decided by the Council of Nice in 325, which fixed Easter on the first Sunday after the full moon which happens upon or next after March 21. If the full moon happens on a Sunday, Easter is the Sunday after.

**Eastern Question**, the name given to the diplomatic and national interests affected by the gradual retrocession of the Turkish Empire in Europe, and the problem of disposing of the territory thus left. Bulgaria, Rumania, Servia, Greece, and Albania are the new states which have naturally arisen on the withdrawal of the Turkish power, and their history, with the respective policies of England, France, Austria and Russia toward them, is the history of the phases of the Eastern Question. Each of the European powers has steadily sought to preserve its own influence in the Balkan peninsula and has tried to prevent the formation of a strong Balkan state which might resist its demands. For this reason the powers created the new autonomous state of Albania at the end of the Balkan War, instead of allowing

Bulgaria and its allies to share the conquered territory among them. Instead of materially increasing the strength of each of the Balkan countries, the war of 1912-1913 merely gave each a few additional square miles and created a new state, even weaker than the rest. The Crimean War, the Russo-Turkish War of 1877-1878, the Armenian massacres of 1896, and the Turko-Grecian War of 1897, are among the notable events connected with the Eastern Question.

**Eastern Rume'lia**, a division of Bulgaria, formerly a Turkish province. In 1885 a revolution occurred, and the province was annexed to Bulgaria. The chief town is Philippopolis.

**Easthamp'ton**, MASS., a town in Hampshire co., 4 mi. s. w. of Northampton, on the Boston & Maine and the New York, New Haven & Hartford railroads. It has manufactures of rubber and cotton goods, buttons and other articles. Williston Seminary for boys is located here, and the town has a public library. Easthampton was settled in 1665 and organized as a town in 1809. It was the scene of an Indian massacre in 1704. Population in 1910, 8524.

**East India Company**, a great English company, originally simply a trading association, which played an important part in the history of Hindustan. It was formed in 1590 in London, with a subscribed capital of about \$150,000, for the purpose of trade with the East Indies. A charter was granted to it by Queen Elizabeth in 1600, giving it the monopoly of trade from the Cape of Good Hope eastward to the Strait of Magellan. In 1609 James I renewed the charter and made it perpetual, reserving power to the crown to recall it at three years' notice. Additional power was granted to the company of seizing and confiscating ships and goods of contraband traders, either in the British dominions or in any of the places where they were authorized to trade. The political rights which it held in India made possible oppressive rule there, and this led in 1784 to the appointment of a Board of Control which supervised all acts of the company except the purely commercial. In 1813 the charter was renewed on condition that the right of exclusive trade should be restricted to China, while the Indian trade should be thrown open to all British subjects. The renewal of the company's charter in 1834 took place amid great opposition to their mercantile and even to their legislative privileges, and on the outbreak of the mutiny of 1857 it was felt indispensable to vest the government



of India directly in the Crown. This was accordingly done in 1858. Henceforth the company existed only for the purpose of receiving payment of the dividends due upon capital.

**East In'dies**, the name loosely applied to India, Indo-China and the Malay Archipelago, including the Philippine Islands.

**East Liv'erpool**, OHIO, a city in Columbiana co., 40 mi. n. w. of Pittsburg, Pa., on the Ohio River and on the Pennsylvania railroad. It is supplied with natural gas and has extensive machine shops and glass factories, many china, porcelain and terra cotta works, and one of the largest potteries in the United States. The place was settled as early as 1795 and incorporated in 1834. Population in 1910, 20,387.

**East'on**, PA., the county-seat of Northampton co., situated on the Delaware River at its junction with the Lehigh, 65 mi. n. of Philadelphia and 75 mi. w. of New York, on the Lehigh Valley, the Lackawanna, the Pennsylvania and other railroads. The city is connected by bridges with South Easton and with Philipsburg in New Jersey. It is built upon hills sloping toward the river and is surrounded by fine scenery. There is a central public square, and the chief buildings include the public library, an opera house and the buildings of a number of educational institutions, chief among which is Lafayette College, the leading Presbyterian college of Pennsylvania. The chief industries include smelting furnaces, machine shops, shoe factories, planing mills, flour mills, silk mills and factories for the manufacture of automobiles, pianos, organs and other articles. The city is in the vicinity of an important coal region and has a large trade. Population in 1910, 28,523.

**East Or'ange**, N. J., a city in Essex co., adjoining Newark and 12 mi. w. of New York City, on the Erie and the Lackawanna railroads. It has well-paved and shady streets, many churches and a public library, and is primarily a residence town for Newark and New York City business men. East Orange was a part of Orange until 1863. Population in 1910, 34,371.

**East'port**, MAINE, a city in Washington co., 190 mi. n. e. of Portland, on Moose Island in Passamaquoddy Bay, and on the Washington County railroad. It is the easternmost settlement of the United States. The city is a port of entry and has a deep harbor. Fishing and sardine canning are important industries, and shipbuilding is also carried on. Eastport was

settled in 1782. Great Britain claimed the islands in the bay and captured the city in 1814, and held it for four years under strict martial law. Population in 1910, about 5000.

**East Prov'idence**, R. I., a town in Providence co., across the Seekonk River from the city of Providence, on the New York, New Haven & Hartford railroad. It contains chemical, electrical and wire works, bleacheries and handkerchief and other factories. It was incorporated in 1862. Population in 1910, 15,808.

**East Riv'er**, a strait in New York, separating New York from Brooklyn and connecting Long Island Sound with New York Bay. It is about 20 miles long, and from  $\frac{1}{2}$  mile to  $3\frac{1}{2}$  miles wide. The famous Brooklyn suspension bridge spans this river. See NEW YORK (city).

**East River Bridge**. See BRIDGE, subhead *Suspension Bridges*.

**East Saint Louis**, ILL., a city in Saint Clair co., on the Baltimore & Ohio, the Chicago & Alton, the Wabash and other railroads, and on the Mississippi River, opposite Saint Louis, Mo., with which it is connected by a long iron bridge. Coal is mined in the vicinity and there are extensive rolling mills, malleable iron works, foundries, machine shops, breweries, glass factories and flour mills. The city contains one of the largest stockyards in the United States and the packing industry is important. East Saint Louis was incorporated as a city in 1865 and has experienced a rapid growth since 1870. Population in 1910, 58,547.

**Eat'on**, DORMAN BRIDGMAN (1823-1899), an American lawyer and reformer, born at Hardwick, Vt., educated at the University of Vermont and at the Harvard Law School and admitted to the practice of law. He early took special interest in movements for the betterment of municipal and national government, drafted the law establishing the board of health in New York City in 1873 and became one of the members of the first civil service commission. He drafted the national civil service act (the Pendleton Act) of 1883, and became a member of the commission appointed under the act. He was reappointed by President Cleveland and served until 1886. He was the author of several works upon civil government and upon special problems in municipal government.

**Eaton**, JOHN (1829-1906), an American educator, born in Sutton, N. H., and educated at Dartmouth College and Andover Theological Seminary. He entered the Civil War as chaplain of an Ohio regiment and was promoted until

## Eaton

he became brigadier general of volunteers. At the close of the war he became interested in the Freedmen's Bureau, of which he was elected first assistant commissioner. He was later superintendent of public instruction for Tennessee, and in 1871 he was appointed commissioner of education for the United States, which position he occupied until 1886, when he became president of Marietta College. In 1898 he was appointed inspector of education for the island of Porto Rico. Doctor Eaton was the author of numerous reports connected with his official positions and a number of magazine articles of value.

**Eaton**, MARGARET O'NEILL (better known as Peggy O'Neill) (about 1796-1879), the wife of J. H. Eaton, President Jackson's secretary of war. On account of somewhat questionable conduct in her previous life, Mrs. Eaton was refused recognition by Washington society. President Jackson in his efforts to overthrow the opposition to her effected a reorganization of his cabinet. The event caused important political consequences, since it cemented the friendship between Jackson and Van Buren and alienated Jackson and Calhoun, causing the nomination of Van Buren rather than Calhoun for president by the Democratic convention in 1836.

**Eau Claire**, *o klair'*, Wis., the county-seat of Eau Claire co., 84 mi. e. of Saint Paul, Minn., at the junction of the Eau Claire and Chippewa rivers and on the Wisconsin Central, the Chicago, Milwaukee & Saint Paul and other railroads. The city is at the head of navigation on the Chippewa and has good water power from both rivers. It is the outlet of the Chippewa lumber district and has extensive sawmills and manufactures of iron and linen goods, furniture, machinery, shoes and other articles. Eau Claire has a public library and Sacred Heart Hospital, and has become a popular summer resort. Population in 1910, 18,310.

**Ebers**, *a'burs*, GEORG MORITZ (1837-1898), a German Egyptologist and novelist. His scientific publications include *Egypt and the Book of Moses*; *Egypt, Description, Historical and Picturesque*, and *From Goshen to Sinai*. He is, however, most widely known by his novels, the most popular of which are *An Egyptian Princess* and *Uarda*.

**Eb'ony**, the name given to the heartwood of various trees of different species, similar in that they all have wood of a dark color. The most valuable is the heartwood of a tree which grows

## Eccentric

in great abundance in the flat parts of Ceylon and is of such size that logs of its heartwood two feet in diameter and from ten to fifteen feet long are often procured. Other varieties of valuable ebony are obtained from the East Indies. Ebony is hard, heavy and durable, and admits of a fine polish or gloss. The most usual color is black, red or green. The best is jet black, free from veins, very heavy, astringent, and of an acrid, pungent taste. On burning coals it yields an agreeable perfume, and when green it readily takes fire from its abundance of fat. It is wrought into toys and is used for mosaic inlaid work and other ornamental purposes.

**Ecarte**, *a kahr ta'*, a game of cards played by two persons with a pack from which the cards below seven have been thrown out. Five cards are dealt to each player, two and then three at a time, or *vice versa*, if the dealer wishes. The eleventh card is turned for trumps. If it be a king it counts one to the dealer. If the non-dealer is satisfied with the cards, he leads, but if not, he says "Cards," and then the dealer may play or, if he is not satisfied, each discards as many cards as he likes, and the dealer gives an equal number after the trump has been removed. This continues until one or the other is satisfied with his hand. The one having the king of trumps must play it and score one before the playing begins. It is always necessary to follow suit, if possible, or to trump, the object being to get all the tricks. The cards rank in the following order: king, queen, knave, ace, ten, nine, eight, seven. Whoever wins three tricks out of five scores a point. If he wins all five tricks he scores two points. The game is five points.

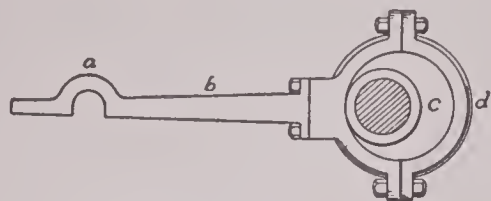
**Ecbat'ana**, an ancient city of Persia, the capital of Media, about 1½ miles from Mount Orontes. The city was situated on a hill and was enclosed by seven walls, and it is said to have been almost thirty miles in circumference. Among prominent buildings were the citadel and the royal palace. The city was a favorite summer residence of the Median, Persian and Parthian kings. History tells us that after the Battle of Arbela in 331 B. C. Alexander followed Darius to Ecbatana and obtained an enormous amount of booty. The city was also plundered by the Seleucidae. After it came into the hands of the Parthians its fall was rapid, and its site to-day cannot be exactly determined, though the present Hamadan is generally considered to occupy the place of the ancient Ecbatana.

**Eccentric**, *ek sen'trik*, a term in mechanics applied to contrivances for converting circular



## Ecclesiastes

into sliding forth and back motion. It consists of variously-shaped disks so attached to a revolving shaft that the center of the disk does not coincide with the center of the shaft. An *eccentric*



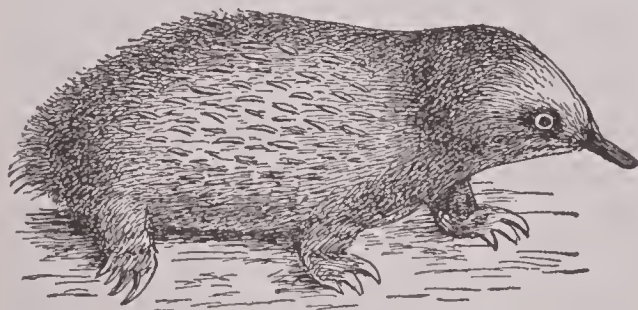
ECCENTRIC AND ATTACHMENTS

a, hook or gab; b, rod; c, eccentric; d, strap.

*tric wheel* is a wheel fixed on an axis that does not pass through the center. Its action is that of a crank of the same length as the eccentricity.

**Ecclesiastes**, *ek kle'ze as'teez*, the title by which the Septuagint translators rendered the Hebrew *Koheleth* (the gatherer of the people), a symbolic name explained by the design of the book and the dramatic position occupied by Solomon in it; one of the canonical books of the Old Testament. According to Jewish tradition it was written by Solomon; but the best modern criticism has decided that its style and language, no less than its thought, belong to a much later date.

**Echidna**, *e kid'nah*, or **Spiny Ant-eater**, a genus of Australian toothless mammals, in size and general appearance resembling a large hedgehog, excepting that the spines are longer, and the muzzle is long and slender, with a small opening at the end through which a long, flex-



ECHIDNA

ible tongue can be thrust. The echidna sleeps during the day. It has short, strong legs and its five toes are armed with powerful claws so that it can burrow easily in the ground. It feeds upon ants and other insects, which it catches with its long, sticky tongue. It is nearly allied to the ornithorhynchus or duckbill, and the two form a peculiar class of animals, having in their structure some of the peculiarities of mammals, birds and reptiles.

**Echinodermata**, *e ki'no dur'mah tah*, the third from the lowest of the seven great branches

## Echo

into which the animal kingdom is divided. Sometimes the echinoderms are grouped together, but each animal leads its individual life. The five parts of nearly all are arranged on a radiating plan something like the spokes of a wagon wheel, this at one time giving them the name Radiata and causing this class to include the Coelenterata. In some species the covering of the echinoderms is a soft, leathery sack, but in others it is a hard shell. The alimentary canal is separate from the body cavity and bones above and below. Motion and the few special senses are governed by a well-organized nervous system. Around the mouth of the animal is a ring-like vessel which is connected with organs in various parts of the body. This constitutes the water vascular system, by which locomotion and breathing are conducted. Water is taken into the ring and carried thence into minute organs called ambulacra, or short tubular "feet," which are thus thrust forward and outward, in the case of the shelled echinoderms, through small pores in the shell. Generations alternate, the egg from the mature animal producing a free-swimming form which differs decidedly from the adult form that grows out of it. There are about 3000 living species found in all the seas of the globe, but they are most abundant in tropical seas. See SEA URCHIN; STARFISH; CRINOIDEA.

**Echo**, *ek'ko*, in Greek mythology, a nymph who fell in love with Narcissus and, because he did not return her love, pined away until nothing was left but her voice.

**Echo**, the repetition of a sound caused by the reflection of sound waves by some moderately even surface, as the wall of a building. The waves of sound on meeting the surface are turned back in their course. In order that the echo may return to the place from which the sound proceeds the reflection must be direct, and not at an angle to the line of transmission, otherwise the echo may be heard by others but not by the transmitter of the sound. This may be effected either by a reflecting surface at right angles to the line of transmission, or by several reflecting surfaces which end in bringing the sound back to the point from which it started. Sound travels about 1125 feet in a second; consequently, an observer standing at half that distance from the reflecting object would hear the echo a second later than the sound. Such an echo would repeat as many words and syllables as could be heard in a second. As the distance decreases the echo repeats fewer syllables, till

only one is repeated. The most practiced ear cannot distinguish in a second more than from nine to twelve successive sounds, so that a distance of not less than sixty feet is needed to enable an ordinary ear to distinguish between the echo and the original sounds. At a near distance the echo only clouds the original sounds, and this often interferes with the hearing in churches and other large buildings. Woods, rocks and mountains often produce wonderful echoes, for which particular localities have become famous.

**Eck, JOHANN MAIER VON** (1486–1543), a celebrated opponent of Luther. When he was trying to confuse Luther with quotations from the church fathers and councils, Luther quoted history and Scripture and finally said, "You run away from the Bible like the devil from the Cross." Eck at last made Luther declare that under certain circumstances it might be right to disobey the pope and council. Eck then went to Rome in 1520 and returned with a papal bull against Luther, in attempting to publish which he met with violent opposition. In 1530, while at the diet of Augsburg, he made the remarkable admission that he could confute the Augsburg Confession by the fathers but not by the Scriptures.

**Eck'ford, HENRY** (1775–1832), an American naval architect, born in Scotland. In 1796 he established himself as a shipbuilder in New York City. He was employed by the United States government during the War of 1812 to construct vessels of war for the lakes and inland waters, and later he became United States naval constructor at the Brooklyn navy yard, where, under his direction, the government built six ships of the line, of which the *Ohio* became the most noted. In 1831 he built a sloop of war for the Turkish navy, and he was preparing to enter the service of that government as chief naval constructor when he died.

**Eclectic's**, a name given to all those philosophers who do not follow one system entirely, but who select what they think the best parts of all systems and combine them into a system. In this century the eclectic method found a notable supporter in the French philosopher, Victor Cousin.

**Eclipse**, *e klips'*, the hiding of one heavenly body by another or by the shadow of another. Stars and planets may suffer eclipse, but the only eclipses visible to the naked eye are those of the sun and the moon.

*An eclipse of the moon* is occasioned by the interposition of the earth between the sun and

the moon; consequently, all eclipses of the moon happen at full moon; for it is only when the moon is on that side of the earth which is turned away from the sun, and directly opposite, that it can come within the earth's shadow. Further,

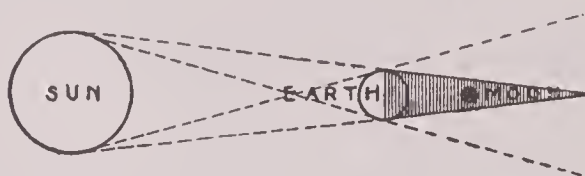


FIG. 1

the moon must at that time be in the same plane as the earth's shadow; that is, the plane of the ecliptic in which the latter always moves. If the moon moved in the plane of the earth's path, there would be an eclipse every full moon, but as the moon's orbit makes an angle of more than  $5^\circ$  with the plane of the ecliptic, it frequently happens that though the moon is in opposition it does not come within the shadow of the earth. In the diagram (Fig. 1) it can readily be seen that to a person on the side of the earth away from the sun, the moon would be in total eclipse for some time. It may also be noticed that to a person on the moon the sun would be in partial eclipse.

*An eclipse of the sun* is the hiding of the whole or part of the sun by the moon as it passes between the earth and the sun; thus, all the eclipses of the sun happen at the time of the new

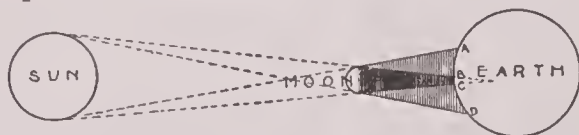


FIG. 2

moon. If the moon hides the whole face of the sun, the eclipse is *total*; if it hides but a portion of the face, the eclipse is *partial*; if all but a narrow ring is hidden, the eclipse is *annular*. The accompanying diagram (Fig. 2) will explain how an eclipse of the sun is caused. To a person standing on the earth between B and C the eclipse will be total; to one between A and B or between C and D the eclipse will be partial.

An eclipse of the sun begins on the western side of his disc and ends on the eastern; and an eclipse of the moon begins on the eastern side of her disc and ends on the western. The average number of eclipses in a year is four, two of the sun and two of the moon; and as the sun and moon are as long below the horizon of any particular place as they are above it, the average number of visible eclipses in a year is two, one of the sun and one of the moon. Astronomers



## Ecliptic

predict eclipses with absolute accuracy, and every year they announce where eclipses will be visible. In the United States total eclipses of the sun were visible in 1806, 1834, 1860, 1869, 1878, 1880, 1889, 1900; others will occur in 1918, 1923, 1925 and 1945.

**Eclip'tic**, the sun's path, the great circle in which the sun *appears* to describe his annual course from west to east—really corresponding to the path which the earth describes. The Greeks observed that the eclipses of the sun and moon took place near this circle, whence they called it the *ecliptic*. The ecliptic has been divided into twelve equal parts, each of which contains 30° (See ZODIAC). The position of the planets and the latitude and longitude of the stars are reckoned by the plane of the ecliptic. The points at which the equator and ecliptic intersect are subject to a continual variation, receding westward at the rate of about 50 seconds a year. The angle at which the ecliptic stands to the equator is also variable, and has been diminishing for about 4000 years at the rate of about 50 seconds in a century. Laplace showed, however, that this variation has certain fixed limits, and that after a certain time the angle will begin to increase again. The combined result of these two changes is to cause the pole of the earth not to point constantly to the same spot in the heavens, but to describe an undulating circle round a certain point. This movement, however, is so slow that it takes many thousand years to complete it.

**Ecole des Beaux Arts**, *a kohl' da bo zahr'*, the French government's school of fine arts, in Paris, perhaps the most important institution of its kind in the world. It was founded in 1648 by Mazarin. Courses are offered in drawing, painting, sculpture, architecture, engraving, modeling and gem cutting. The school of architecture is now one of the most important branches of the Ecole des Beaux Arts. In 1666 the *prix de Rome* was instituted, and competitions for this take place at this school. The competition is open to all artists between the ages of fifteen and twenty-five, whether pupils of the school or not, after they have passed two preliminary examinations. The successful competitors are given an annual allowance from the State for three or four years, two of which must be passed at Rome. There are in the school about 1300 students, most of whom are French. The number of Americans is larger than that of any other foreign nation.

## Ecuador

**Ecol'ogy**, a name rather recently given to that department of botany which treats of plants in their relations to their surroundings, and which deals with such subjects as the distribution of seeds, cross fertilization and the grouping of plants according to soil and climatic conditions.

**E'conom'ics**. See POLITICAL ECONOMY.

**Ecuador**, *ek'wah dor*, a country of South America, extending from 1° 45' north latitude to 5° south latitude, lying between Colombia on the n., Peru on the s. and the Pacific Ocean on the w. The eastern boundary is in dispute, so that the exact area is not known. The area usually given, however, is 115,650 square miles, making the country a little larger than Arizona.

**SURFACE AND DRAINAGE**. The surface of Ecuador is divided into three regions: the lowland region along the coast; the highlands, including the mountains and plateaus in the central portion of the country, and the extensive plains on the east. The coast region is comparatively narrow, and from this the highlands rise abruptly to the plateau, upon which two parallel ranges of the Andes rest, extending north and south. Among the groups of mountains of this region are sixteen peaks having altitudes ranging from 15,000 to 20,500 feet. The most noted of these are Chimborazo, 20,500 feet, and Cotopaxi, 19,600 feet, as far as known the highest active volcano in the world. Near the northern boundary these parallel ranges converge and form several elevated tracts, known as *knots*, the most prominent one being in the southern part of Colombia. Toward the south there is a similar convergence, and between these points are a number of plateau valleys, the most important being those of Quito, Ham-bato and Cuenca. In elevation these range from 8000 to 14,000 feet. Their soil is fertile, and they are the home of the greater part of the population of the country. East of the Andes the land slopes to the great plain, which is continuous with the basin of the Amazon.

Most of the rivers are rapid mountain streams and are of little value for navigation. However, the Amazon, known in this part of its course as the Marañon, is navigable to the point nearest to the southern boundary, and some of the larger tributaries can be ascended a part of the way with small boats. The most important of these are the Santiago, the Japura and the Napo. Some of these streams flow for a part of their course through Peru. The

principal rivers flowing into the Pacific are the Mira, Esmeralda and Guayas.

**CLIMATE.** Being directly under the equator, Ecuador has a tropical climate, but owing to the varying elevations, this is greatly modified, so that actually within the country all grades of climate, from the tropical to the frigid, are found. The lowlands on the coast are exceedingly hot, moist and in many localities unhealthy; and the plains on the east are hot and comparatively dry, while the plateau valleys have a temperate and salubrious climate, in which spring reigns throughout the year. Above these, the highest altitudes of the mountains have a rigorous, cold climate, and most of the summits are crowned with perpetual snow. The rainfall is ample for agricultural purposes, and throughout the country there are two seasons, known as the wet and the dry, though in the plateau valleys these are not distinctly marked.

**MINERAL RESOURCES.** Ecuador has rich deposits of minerals, consisting of gold-bearing quartz, silver ore, deposits of copper, iron, mercury and petroleum. Emeralds and other precious stones have also been found within the country. However, owing to lack of transportation facilities and the lethargy of the people, none of these has been worked on an extensive scale.

**INDUSTRIES.** Agriculture is the leading industry and is carried on chiefly in the plateau valleys. Wheat and barley sufficient for home needs are raised, and in some districts corn is successfully cultivated. Cattle are raised on the plains, and on the west side of the mountains there are many large tracts devoted to the cultivation of the cacao tree. Coffee is also raised upon the lowlands. Cacao, cinchona bark, sarsaparilla, india rubber, coffee, hides and sugar are the agricultural and forest exports. Manufactures are few and are confined almost entirely to domestic industries, except the manufacture of Panama hats, which are made from the midrib of the leaf of the screw pine. This work is done almost entirely by the indians, and because dampness is essential to the best results, most of the weaving is done at night.

Transportation facilities are very poor. The only carriage road is from Quito to Guayaquil and has a length of about 125 miles. There is also a line of railway connecting Duran, opposite Guayaquil, with Guamote, 125 miles distant. The country contains about 1250 miles of telegraph lines. Throughout the interior

all goods are carried upon pack animals, and lack of transportation facilities prevents extensive commerce with foreign countries. Most of the foreign trade is with France and Great Britain.

**INHABITANTS AND LANGUAGE.** Fully one-half of the people of Ecuador are indians. These belong to two or three different nationalities, but those descended from the ancient Incas far outnumber the others. These indians have partially adopted the manners and customs of civilization. They are peaceable and industrious and are generally devoted to tilling the soil, raising live stock and manufacturing Panama goods. They speak the Quichua language. Aside from the indians the inhabitants consist of Spaniards and Creoles, who are a mixed race descended from Spaniards, negroes and people of other nationalities. Spanish is the prevailing language among these people, and it is the official language of the government.

**GOVERNMENT AND RELIGION.** The government is republican in form. The chief executive is a president, who is elected by direct vote for four years. The legislative power is vested in a Senate and a Chamber of Deputies, which corresponds to our House of Representatives. The senators are apportioned two to each province and are elected by direct vote for a term of four years, while the members of the lower house are elected for a term of two years. The local government of each province is administered by a governor. The Roman Catholic religion prevails and is embraced by nearly all the inhabitants.

Education is in a backward state. There are few public schools and no advanced educational institutions of importance.

**CITIES.** The chief towns are Quito, the capital, and Guayaquil, the chief seaport, each of which is described under its title.

**HISTORY.** Ecuador was a part of the empire of the Incas, and the country still contains remains of roads and other public works constructed by these people before they were conquered by the Spaniards. For some time after the conquest it was under the government of the viceroy of Peru. In 1822, along with other Spanish colonies, Ecuador gained its independence and became a part of the Republic of New Granada, now Colombia. This union was dissolved in 1829, since which date Ecuador has been an independent state. Population, estimated at 1,400,000.



**Ed'da**, the name given to two ancient Scandinavian works, known respectively as the *Elder*, or *Poetical Edda*, and the *Younger*, or *Prose Edda*. The first of these was compiled probably sometime between the tenth and the thirteenth centuries, and consists of a collection of thirty-three songs which treat of the Scandinavian gods and heroes. The *Younger Edda* presents a kind of synopsis of the Northern mythology, with a treatise on the poetry and versification of the skalds, or ancient poets. It is supposed to have been written in the thirteenth century, but was first published in the seventeenth.

**Ed'dy**, CLARENCE (1851- ), an American organist and composer, born at Greenfield, Mass., and educated in America and in Germany. On his return to the United States in 1875 he settled in Chicago, becoming organist, successively, in several of the foremost churches. He was soon considered the leading organist in the West, and even in America, and later he was recognized, as both artist and composer, by foreign critics.

**Eddy**, MARY BAKER (1821-1910), the discoverer and founder of Christian Science, born at Bow, N. H., July 16, 1821. She received her early education from her brother, Albert Baker, and at a private school in Tilton, N. H. Always thoughtful and religious, she early united with the Congregational Church, of which she remained a member until after her discovery of Christian Science. Of this discovery, which came to pass when she was living in Lynn, Mass., she wrote: "During twenty years prior to my discovery I had been trying to trace all physical effects to a mental cause; and in the latter part of 1866 I gained the scientific certainty that all causation is Mind and every effect a mental phenomenon."

In 1875 Mrs. Eddy published *Science and Health with Key to the Scriptures*, the Christian Science text-book, which has been through many editions and has been translated into German. Among her works written later are *Miscellaneous Writings*, *Unity of Good*, *The Church Manual*, *Retrospection and Introspection*, *Rudimental Divine Science*, and *Pulpit and Press*. In 1879 she organized the Church of Christ, Scientist, which in 1892 was reorganized as the First Church of Christ, Scientist, in Boston, Mass. In 1881 she opened the Massachusetts Metaphysical College, the only institution of this kind having a charter from the Commonwealth. Mrs. Eddy founded the periodicals of the denomination now issued by the Christian Science Publishing So-

ciety from its building in Boston, including the *Christian Science Journal*, a monthly; *Der Herold der Christian Science*, a German monthly; the *Christian Science Sentinel*, a weekly; and the *Christian Science Monitor*, an international daily.

When a young woman, Mrs. Eddy was married to George Washington Glover and removed with him to Charleston, South Carolina, where he died. In 1877 she married Dr. Asa G. Eddy, who was associated with her in the work of Christian Science.

For a number of years, Mrs. Eddy lived in comparative retirement at Concord, N. H. In 1908 she went to Chestnut Hill, a suburb of Boston, where she remained until her death in 1910, loved and revered by a vast multitude of people. Unlike many reformers, Mrs. Eddy was privileged to see the fruition of her work in the wide acceptance of her teachings. Before her death she was recognized as one of the world's great religious leaders. See CHRISTIAN SCIENCE.

**E'den**, in biblical literature, the country where man first resided. Much has been written upon the probable locality of Eden, but writers fail to agree in establishing its boundaries, though nearly all concur in locating it somewhere near the head of the Persian Gulf, probably in the valley of the Euphrates, as this country conforms more closely than any other part of the world to the description given in Genesis.

**E'denta'ta**, or toothless animals, a large and varied order of mammals, which is not happily named, for some of them have teeth. All are more or less perfectly covered with coarse hair, which in some is united into plates that make a protective armor. Their limbs are clawed. The Edentata are scattered over all of the grand divisions excepting Europe. In South America are found the sloth and the great ant-eater; in South Africa, the aard-vark; in America, from Texas southwestward, the armadillo; and in Asia and Africa, the pangolin. These may be considered representative animals of the order.

**Ed'gar Ath'eling** (about 1057-about 1120), grandson of Edmund Ironside. After the Battle of Hastings, Edgar was proclaimed king of England by the Saxons, but William the Conqueror retained the power. Having been engaged in some conspiracy against the king, Edgar was forced to seek refuge in Scotland, but he became reconciled to William and was assigned a pension. Afterward, with the sanction of William Rufus, he undertook an expedition to Scotland



MRS. MARY BAKER G. EDDY



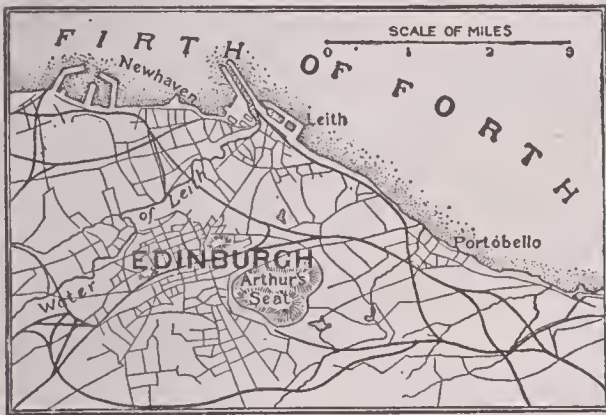


## Edict of Nantes

for the purpose of displacing the usurper of the Scottish throne in favor of his nephew Edgar.

**E'dict of Nantes**, *nahNt*. See NANTES, EDICT OF.

**Edinburgh**, *ed' 'n bur'o*, the capital of Scotland. It is picturesquely situated, being built on three eminences, surrounded on all sides by lofty hills, except on the north, where the ground slopes gently toward the Firth of Forth. It is divided into an Old Town and a New Town, and between these runs Prince's Street, one of the finest promenades in the world. Through the Old



Town runs Canongate Street, rising gradually for almost a mile, and parallel with this is Cowgate Street. On the east, Calton Hill, 349 feet high, overlooks the city. Near by are Salisbury Crags, and directly behind this a rocky hill, Arthur's Seat, 796 feet high.

Among the notable buildings are the ancient Parliament House, now the seat of the Supreme Court of Scotland; Saint Giles's Church, or Cathedral, an imposing edifice in the later Gothic style, recently carefully restored; the Tron Church; Victoria Hall, with a fine spire, and the Bank of Scotland, besides some of the old family houses of the Scottish nobility. Sir Walter Scott's monument is in the New Town. In the Old Town the most remarkable public building is the Castle. In an apartment here are kept the ancient regalia of Scotland. About a mile northeast of the castle is the celebrated royal Palace of Holyrood, which had its origin in the abbey founded by David I in the twelfth century. No part of the present Palace is older than the time of James V (1528). In the northwest angle of the building are the apartments which were occupied by Queen Mary, nearly in the same state in which they were left by that unfortunate princess.

Among the various educational institutions are the University of Edinburgh, one of the most famous in Europe; the Advocates' Library, the

## Edinburgh

largest library in Scotland, containing upward of 250,000 printed volumes and 2000 manuscripts, and a fine public library erected by Andrew Carnegie. Besides the buildings already noted, Edinburgh possesses a large number of important edifices and institutions, chief among which are the Royal Institution, the National Gallery of Scotland, the Museum of Science and Art, the new Episcopal Cathedral of Saint Mary's and the Edinburgh Royal Infirmary, one of the best hospitals in Europe. This city is the headquarters of the book trade in Scotland and is the seat of the chief government departments.

Edinburgh is not an important manufacturing town; it has, however, various industries, including brewing, printing and publishing. The port is Leith.

The origin of Edinburgh is uncertain. Its name is thought to be derived from Eadwinsburgh, the Burgh of Edwin, a powerful Northumbrian king, who absorbed the Lothians in his rule. The town was made a royal burgh in the time of David I; but it was not till the fifteenth century that it became the recognized capital of Scotland, under the Stuart kings. Population in 1911, 320,315.

**Edinburgh**, ALFRED ERNEST ALBERT, Duke of (1844-1900), second son of Queen Victoria, also earl of Ulster, earl of Kent, duke of Saxony and duke of Saxe-Coburg-Gotha. He was educated by special tutors, and at the age of fourteen he joined the royal navy and served in various foreign stations. In 1862 he declined the offer of the throne of Greece. In 1867 he was appointed to the command of the frigate *Galatea*; in 1882 he was made vice admiral and in 1886 he became admiral of the squadron in the Mediterranean. He married in 1874 the grand duchess Marie, only daughter of Alexander III, emperor of Russia.

**Edinburgh**, UNIVERSITY OF, a university established at Edinburgh, Scotland, in 1582, by a charter granted by James VI. The government is vested in a senate, the university court and a general council. The general council consists of the chancellor, members of the university court, the professors and all graduates of the university. Four faculties are maintained: liberal arts, divinity, law and medicine. A special school is provided for women, who are now allowed to graduate in art, science and medicine. The medical department has attained a world-wide reputation for its efficiency. The faculty numbers 125 and there are over 3100 students enrolled. The library contains



220,000 volumes and many manuscripts. In addition to this, there is a theological library of about 10,000 volumes.

**Edinburgh Review**, a famous periodical, founded in October, 1802, by Francis Jeffrey, Sidney Smith, Francis Horner, Henry Brougham and others. It was the first of the great critical periodicals and had from the outset a marked influence on literary life in England.

**Ed'ison**, THOMAS ALVA (1847- ), an American electrician and inventor, born at Milan, Ohio. He received a common school education and began work as a train boy on the Grand Trunk Railway. He learned printing and edited and printed the *Grand Trunk Herald* in the baggage car of the train on which he was employed. A station master whose child he had rescued taught him telegraphy, and he soon became a very rapid and skillful operator. He was employed by the Western Union Telegraph Company, and there he began the series of inventions which have brought him fame and fortune. After brief sojourns in several Western cities he settled in Boston. Carrying on his experiments there, he was able to overcome the difficulties connected with sending two messages in opposite directions at the same time over the same wire, and invented the duplex telegraph, which has proved a highly valuable improvement. In 1868 Edison happened to be in New York when the indicator at the Gold and Stock Exchange broke down. He volunteered his services and succeeded in adjusting the instrument.

His laboratories were first located at Menlo Park, N. J., and later he established headquarters at Orange, N. J., where he afterward lived. A score of skilled investigators were employed in his factories until 1876, when Mr. Edison, because of declining health, gave up his manufacturing interests. He took out nearly four hundred patents. He devoted himself mainly to electricity, but had marked success in other lines. Some of his most valuable inventions, patented in other countries as well as in America, are the phonograph, an instrument for making permanent records of articulate sounds; the microphone, which detects the faintest sound; the megaphone, by the aid of which ordinary sounds can be heard at a great distance; the microtasmeter, which records minute variations in temperature. His incandescent lamp combines purity, steadiness, safety and simplicity and is the most widely used of all of his inventions. The kinetoscope, which is one of his latest

inventions, is an apparently moving panorama, or machine for throwing moving pictures. Edison clearly holds the foremost position among inventors of the nineteenth century. His influence on the industries and commerce of America cannot be overestimated.

**Ed'monton**, the capital of the Province of Alberta, Canada, 800 mi. n. w. of Winnipeg and 525 mi. e. n. e. of Vancouver. The city is situated on the Canadian Northern, the Canadian Pacific and the Grand Trunk Pacific railways. It is in the midst of a fertile agricultural region, which, however, is only partially developed. It is also in the center of a territory which furnishes cheap and abundant fuel and valuable raw materials in many lines, affording opportunity for the development of manufacturing enterprises, of which a few are already established. The city has excellent transportation facilities and is the distributing center for the central and northern parts of the province, and also for the north of Alberta. It owns most of its public utilities and its government is modeled upon the most modern plans. Population in 1911, 24,900.

**Ed'mund I** (922-946), king of England, grandson of Alfred the Great; he succeeded his brother Athelstan in 940. He put down a serious revolt in the north and conquered Cumbria, which he bestowed on Malcolm, king of Scotland. He was slain at a banquet.

**Edmund II**, surnamed *Ironsides* (about 981-1016), king of England, the eldest son of Ethelred II. He was chosen king in 1016, Canute having been already elected king by another party. He won several victories over Canute, but was defeated at Ashington, in Essex, and was forced to surrender the midland and northern counties. He died after a reign of only seven months.

**Edmunds**, GEORGE FRANKLIN (1828- ), an American statesman, born in Richmond, Vt. He became a lawyer and was a representative in the legislature from 1854 to 1859, serving three years as speaker. In 1861 he was elected to the state senate, and in 1866 he became United States senator, which office he held by constant reelection until 1891. He gained note as the champion of a bill for the suppression of polygamy in Utah, passed in 1882. He was a candidate for the presidential nomination in the Republican national conventions of 1880 and 1884. After his retirement he became eminent as a constitutional lawyer.

**E'dom** (in the New Testament, Idumaea), in ancient times a country lying to the south of



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THOMAS A. EDISON





Palestine. It was the mountainous tract stretching between the Dead Sea and the Gulf of Akabah. The chief city in this region was Bozrah, which now presents remarkable ruins.

**Ed'uca'tion** (from the Latin *educare*, to lead forth), in its broadest sense, the art of developing and cultivating all the powers of man; in a narrower sense, and that in which the term is ordinarily used, the development and cultivation of the intellectual powers. Education is as old as the race and has always had for its purpose the supplying of some human need; therefore almost every conceivable phase of the art has been developed. These phases have been variously classified at different periods of history and by different authorities. The following divisions are those most generally accepted by the best modern authorities.

When applied to the development of the different powers of the individual, education is divided into physical, intellectual and moral. *Physical education* pertains to the development of the body and has for its purpose the perfecting of the physical powers, so as to give the individual control over his bodily powers and to keep him in health. When specialized, this education becomes *athletic training*. *Intellectual education* has for its aim the development of the intellectual powers and is the phase usually understood when education is mentioned without qualification. Courses of study pertain more extensively to this phase of education than to any other. *Moral education* deals with the training of the will and the education of the conscience. It is so closely interwoven with intellectual education that in practice the two are inseparable. When extended to educating the individual concerning the relation between himself and a supreme being, it becomes *religious education*, which is the highest phase that the art can assume.

When considered from the point of view of the grades and kinds of instruction, education is divided into primary, secondary, higher, professional and special education. *Primary education*, in the broadest application of the term, includes all instruction given in common and graded schools below the high school or academy. In its restricted application, it includes only the work of the first three years of the graded school course. *Secondary education* includes instruction in high schools, academies and other schools of similar grade. The term applies to all instruction, except professional and special, between the graded school and the college.

*Higher education* includes instruction in colleges and universities, and in many of its branches it becomes highly specialized. *Professional and technical education* has for its purpose the training for special vocations, such as medicine, law or engineering. Many professional schools are organized as departments of colleges and universities. *Special education* includes those means of instruction provided for special classes, such as the blind, deaf and dumb and feeble-minded. In the United States this phase of education is usually provided for by institutions supported by the different states. There are also, of course, many private schools for these special classes.

**EDUCATION, HISTORY OF.** Education in some form has existed since the coming of man, and each tribe has had its form of training, designed to fit the child for the peculiar life which he was to live, still these early efforts do not merit a place in a brief treatment of the subject. Such a treatment must necessarily begin with the systems of the earliest civilized nations. The history of education may be most logically treated under the following divisions: I. The Oriental nations. II. The ancient classic nations. III. Christian education in Europe. IV. Education in the United States.

**I. THE ORIENTAL NATIONS.** The earliest schools which deserve mention are those of Egypt, China, India and Persia. In these nations, as in all others, the systems of education are inseparable from the prevailing religion of the people. Worship of ancestors among the Chinese made their system of education ancestral in character and caused the family to be responsible for the training of children. Among the people, education has ever been the means of advancement, and government positions are open only to those who pass severe examinations which are managed by government officers. The caste system of India developed a similar system of education. Parseeism, the prevailing religion among the Persians, resulted in a system of training for which the State was responsible after the child was seven years old. Persian education taught a genuine system of morals, instead of external formalism. In ancient Egypt education was under the control of the priests. The common people had little training, save that which the children and youth obtained at home, and this pertained almost wholly to their daily occupations. In all these systems, the education of women was sadly



neglected. Each system had for its object the making of the individual subservient to dogmatic authority, the part of a system, either religious or political.

In marked contrast to the educational systems of other Oriental nations was that of the Israelites. They believed themselves to be the chosen people of Jehovah and that it was their divinely appointed mission to preserve the knowledge of the true God among idolatrous nations. Education was conducted by the family, and the father was the teacher. The boys were taught reading, writing and numbers, and also a trade; the girls were trained in household occupations, and both sexes were instructed concerning their religious duties. Hebrew education has been influential in shaping the later educational systems of Europe, and it has preserved the Jews as a separate and distinct race for more than 4000 years.

II. THE ANCIENT CLASSIC NATIONS. The educational systems of Greece and Rome differed from those of the Oriental nations in that they gave attention to the development of the individual. Their system did not fit man merely to become a member of a family, a state or a caste, but he was to choose his vocation and to aspire to the highest positions in politics, art and literature.

*Greece.* The two systems of Grecian education deserving notice are the Spartan and the Athenian.

Spartan education was almost entirely physical and essentially military; its highest aim was the making of good soldiers.

Athenian education was a common affair of the family and the State. Its aim was the perfect Athenian or the perfect Greek. To the physical training of Sparta it added intellectual, moral and aesthetic culture. It was more complete than the systems that preceded it and in some respects approached the modern systems of Europe and America. See ARISTOTLE; PLATO; SOCRATES.

*Rome.* Until after the introduction of Greek culture, Roman education was extremely practical and excluded everything tending to aesthetic culture. There were no state schools, and the education of the youth depended upon the family; consequently, children of poor parents received little or no training. Both boys and girls were educated, and to Rome is due the inauguration of that movement for the elevation of women which the English-speaking countries are destined to complete. The introduction of

Greek art and literature extended the education of the wealthy classes to include these subjects. Rome gave more attention than previous nations to the science and art of teaching, and the writings of Cicero, Varro, Seneca, and especially Quintilian, contain some excellent educational theories. Roman education was an advance upon Athenian and was a step nearer that of modern times.

III. THE CHRISTIAN ERA IN EUROPE. This era is divided into two periods, the period previous to the Reformation, and that following the Reformation.

*Early Period.* During the first centuries of the Christian dispensation, education received little attention. Christianity taught a new system of morality and set before its followers ideals in marked contrast to those of the pagan world. The early Christians were of the uneducated classes; besides, they were persecuted to such an extent that they had no opportunity for study or contemplation, aside from that given to their religion. These conditions tended to the development of asceticism, and until after the tenth century the study of the literature of the ancient classic nations was considered detrimental to the best interests of the Church and of the students. Education was confined to the monks, and schools were accessories of the Church. Later, monasteries were established, and in these a few monks began again the study of the classics. - They made copies of the ancient manuscripts, and it was through the copies, treasured up in the early monasteries, that these masterpieces of literature were preserved to the centuries that followed. Some monasteries had day schools in which children were taught to read and write.

The most influential movements in the interests of general education were made by the great rulers Charlemagne and Alfred. Charlemagne desired to rule over a civilized and educated people, and to this end he greatly extended the educational facilities of his empire. The sphere of the parochial school was enlarged and local priests were required to teach, in addition to religion, reading, writing, arithmetic and music. Alfred the Great believed that all men should be free and that education was essential to the maintenance of this freedom. He therefore sought to establish schools throughout his kingdom, in which reading and writing could be taught. The successors of these great leaders, however, were unable or unwilling to carry out their plans, and the

movement was not productive of permanent results.

In the latter half of the Middle Ages, there arose a constantly increasing demand for secular education. Industrial conditions made a knowledge of reading, writing and arithmetic imperative among merchants and artisans. Out of this demand arose the forerunners of the public schools of to-day. They were known as the burgher, or town, schools. While these schools were secular, they were, nevertheless, under the control of the clergy. Reading, writing, arithmetic, geography, history and natural science were taught, and Latin was sometimes introduced. In the twelfth century there was a universal intellectual awakening. This resulted in an age of Scholasticism, in which the study of reasoning and the practice of subtle dialectics occupied the attention of learned men. This led to no new thought, but made its devotees blind followers of dogmatic authority.

All developments of the Middle Ages gradually contributed to the growth of the scientific spirit, but the influence of the Crusades and the rise of the Mohammedans were the two sources from which this spirit received its greatest impetus. The most important result of the newly awakened scientific spirit was the founding of great universities by both the Church and the State. Some of these, such as the University of Paris and that of Heidelberg, have exerted an immeasurable influence on each succeeding century and are now among the strongest educational institutions of the world. See HEIDELBERG, UNIVERSITY OF; PARIS, UNIVERSITY OF.

The influence of all these movements culminated, during the last years of the Middle Ages, in the Renaissance, in which there was a general revival of learning; the people of Europe emerged from the despotism of ecclesiastical and feudal institutions, and independent nations were established.

*The Reformation.* The Reformation (See REFORMATION) is the greatest event in modern history. It wrested thousands of communicants from the Church and arrayed them in opposition to it and at the same time so stirred the Church itself that from the agitation came one of the greatest educational movements of history. Protestantism was based on two principles: 1, Man is justified by faith alone. 2, The Bible is the only guide in religious faith and practice. If men were to follow the Bible, they

must be able to read it, and from this necessity sprang those schools in which children were taught to read their mother tongue. The system, however, was soon carried far beyond the original purpose of educating merely for the sake of the Church. Girls as well as boys were to be educated, the schools were to be maintained at public expense and the brightest pupils were to be trained for teachers. What Luther began in the sixteenth century Comenius extended in the seventeenth. By the emphasis which he placed on training the powers of observation, he laid the foundation of modern methods of instruction in elementary schools, as Bacon's inductive philosophy laid the foundation for later methods of scientific investigation.

The Catholic Church, for the purposes of preventing further dissension among its members and of counteracting the influence of the Protestant schools, founded the order of Jesuits (See JESUITS). This order, under the leadership of Ignatius Loyola (See LOYOLA, IGNATIUS), became one of the strongest religious organizations the world has ever known. Through its exertions schools of a high grade were universally established and maintained. Thus the Reformation led to the extension of educational advantages to the common people, both of Catholic and Protestant faiths.

Early in the sixteenth century John Sturm of Prussia perfected in Strassburg a system of graded instruction, similar in plan to that now in vogue in the leading countries of Europe and in the United States. The great English schools at Eton, Winchester and Westminster were based upon Sturm's model, and, with such modifications as the progress of thought has made necessary, they still follow it.

During the sixteenth and seventeenth centuries, both Catholics and Protestants gave much attention to the universities; those already established were strengthened and many new ones were founded. But these institutions were conservative and were very slow to make any changes. The seventeenth century saw a strong reaction against the courses of study in vogue during the sixteenth, as well as the establishment of broader courses, including more practical subjects. There was also great improvement in the methods of instruction, based on the teachings of Bacon and Comenius. In the eighteenth century, the foundations thus laid were extended and to some degree perfected, and there was a gradual extension of the primary



school to include the children of all classes. During the nineteenth century, the public school systems of all the leading countries of Europe were perfected, and in most cases a perfect articulation exists between the primary and secondary schools, and between the secondary school, or gymnasium, and the university. During the four centuries following the Reformation, public education was gradually removed from the control of the Church to that of the State. But the parochial school and the denominational seminary and university have nevertheless remained and are still important factors in the educational systems of all civilized countries.

IV. THE UNITED STATES. *The Colonial Period.* The American colonists were interested in education, but local conditions and the classes of settlers in each section developed widely different systems in the New England and Southern colonies. New England was settled by the sturdy middle class. Nearly all were educated, and many were college bred. The people of Massachusetts believed that public schools were necessary for both religious and secular purposes. In 1647 the Massachusetts General Court passed a law providing that every town of fifty or more families should establish a primary school, the expense of maintaining the same to be met by the parents of the children or by the settlers in general. It was also ordered that every town of one hundred or more families should maintain a grammar school which should fit its students for college. The common school of Massachusetts furnished the model after which the public schools of the northern colonies were patterned.

Harvard College was opened in 1638 and graduated its first class in 1642. The enactment of the School Law of 1647 placed this institution in close relationship to the common schools. Harvard was the forerunner of several similar colleges which have attained more than a national reputation. Yale was founded in 1701, Williams in 1755, Bowdoin in 1764 and Dartmouth in 1769. Each of these institutions is described under its title.

Conditions in the Southern colonies developed an entirely different educational system. The large estates caused the country to be sparsely settled and made gatherings of the people difficult. The township, as a civil organization, was unknown, and the parish was the unit for local administration. Moreover, the most influential settlers came from the aristocratic class in Eng-

land and did not consider the education of the common people to be important. Elementary education was consequently left to the care of the family. The children of the wealthy were taught by private tutors, and those of the poor were left to grow up in ignorance. In these colonies public attention was given to higher education. William and Mary, the second oldest college in the United States, was founded at Williamsburg, Va., in 1661, and King William School, which afterwards became Saint John's College, was established in Maryland in 1694. These schools were typical of others established in the South as occasion required.

New York, Pennsylvania and the other colonies gave early attention to the education of the common people, on plans similar to those of the New England colonies. Before the Revolutionary War, almost every colony had a well-defined policy in regard to education.

*The National Period.* The national government left public education to the care of the several states. In the original states, the systems already established were continued, while the territories formed systems modeled after those in the states from which a majority of the settlers came. The most important causes in bringing education in the United States to its present degree of efficiency were (1) the congressional land grants, (2) the free school system, (3) the establishing of state universities and agricultural colleges and (4) the organization of a national bureau of education.

(1) Congressional Land Grants. The first provision for government aid to education was in the ordinance for the organization of the Northwest Territory, passed in 1785, which provided that the sixteenth section of every township should be reserved for common schools. This provision was confirmed in the Ordinance of 1787 and later by the national government, and the income from the sale or lease of these lands constitutes an important part of the permanent school fund of the states formed out of the territory (See ORDINANCE OF 1787). Congress made a similar grant to all territories afterward organized, so that each state admitted since 1799 has had the benefit of a land grant. In 1848 the grant was extended to include the thirty-sixth section, and all states admitted since that date have had two sections from each township for common school purposes. Several states have had their fund increased by large grants of swamp lands. Each state has entire control of its school lands. In some, the lands are sold

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and the funds invested where they will pay the largest dividends; in others, they are leased, and the annual rental constitutes part of the distributable fund, a portion of which goes to the support of every common school in the state.

(2) Free Schools. While the common school was established by the assembly of Massachusetts with the intention of making instruction free, it was a long time before this ideal was realized throughout the country. As late as 1865, tuition, in the form of rate bills, was collected in New York, Connecticut, New Jersey, Rhode Island and Michigan and the practice did not wholly disappear until 1871. While every community provides elementary instruction at public expense, there is still a divergence of opinion in different states as to the extent to which this practice should be carried, the tendency in the newer states being towards a broad application of the plan. In many of these, free instruction extends through the state university, and in all states it extends through the high school.

(3) State Universities. The land grant of 1787 set aside two townships in every state for a university. This amount was increased at different times by state and national grants, until each of the states admitted after the adoption of the Constitution has a liberal income for a state university. Some of these universities have attained more than a national reputation, and their collective influence on education in the country is beyond measure. They have stimulated secondary schools, elevated educational ideas and made it possible for thousands of young men and women to obtain a college education who would otherwise have been deprived of the opportunity. The agricultural colleges, supported in part by the state and in part by the national government, are usually connected with the state university. See AGRICULTURAL COLLEGE; UNIVERSITY, subhead *American Universities*.

(4) Bureau of Education. In 1867 a national bureau of education was established and made an office in the department of the interior. The bureau is in charge of the United States commissioner of education, who collects educational statistics and disseminates a large amount of valuable information through his reports and through circulars. The work of the bureau is advisory, but it has rendered important service in securing more uniform systems of education in the different states and also in giving valuable

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information on methods of school management and instruction.

The United States has no national system of education, and the national government has no authority over the public school systems of states; nevertheless, the various state systems are now so similar in their plan of grading and the scope of their instruction as to form, collectively, a national system that is winning the admiration of the world.

See COMMON SCHOOLS; EDUCATION, NATIONAL SYSTEMS OF; PEDAGOGICS. Consult Painter's *History of Education*; Compayre's *History of Pedagogy*; Quick's *Educational Reformers*; Oscar Browning's *History of Educational Theories*; Boone's *History of Education in the United States*.

**Education, COMMISSIONER OF**, the officer at the head of the Bureau of Education in the United States. The office was established in 1867, and Henry Barnard (See BARNARD, HENRY), was appointed first commissioner. The appointment is by the president with the consent of the Senate. The chief duty of the commissioner is to collect educational statistics and give such information relative to the inspection, organization and management of public schools and methods of educating as will be of assistance in improving public education throughout the country. The commissioner publishes biennial reports, which embody his recommendations, together with much valuable information concerning the educational systems and methods of teaching, not only in the United States but in other countries.

**Education, COMPULSORY**. The right of the state to educate the child for citizenship has been recognized from ancient times. The best example of compulsory education among the early nations is the system adopted by the Spartans (See EDUCATION, HISTORY OF). Their education of boys was primarily military and had for its purpose the making of soldiers. But from compulsory training in military affairs to compulsory training in other lines was an easy step, and Athens extended her training to include other subjects than those dealing with war.

As the term is now applied, *compulsory education* means compelling the attendance of children of school age, usually between six and fourteen or six and sixteen years of age, upon the elementary schools, public or private, for a specified number of months each year. Laws compelling such attendance are in force in Great



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Britain, Germany, Switzerland, Norway, Sweden, Denmark and France and are on the statute books of most other European countries, but are not rigidly enforced. In the United States compulsory attendance measures are almost as old as the public school system, but state laws for the purpose did not receive general attention until the last half of the nineteenth century. Most of the states now have stringent laws requiring parents to send children to school and providing for fines, and in some cases for imprisonment, as penalties for failure to comply with the law. Children who have acquired a knowledge of the branches taught in the common schools, defectives and those in ill health are exempt. Compulsory education laws are necessary because of the increasing tendency to employ children in mines, factories and large stores. In the large cities these laws are quite rigidly enforced, but in the rural districts and in most of the smaller towns the authorities are usually indifferent.

The laws are enforced by truant officers, who are appointed by the local board of education. These officers have authority to arrest any child to whom the law applies and commit him to school in his district. If, after warning, the parents do not keep their children in school, the truant officer has authority to have such parents arrested and brought before the local court for trial. In large cities truant schools, in which habitually truant pupils can be confined, are established.

**Education, NATIONAL SYSTEMS OF.** In nearly all countries the systems of public instruction are managed directly by the national government. The most noted exceptions to this rule are the United States and Switzerland.

**GREAT BRITAIN.** The general oversight of public instruction in Great Britain is under the Board of Education for England and Wales. This board is comprised of the lord president of the council, the principal secretaries of state and the chancellor of the exchequer. In 1902 an educational law which provides for the control of the elementary schools outside of London was passed. This placed the elementary schools in the immediate charge of the county council, or council of the county boroughs. Previous to this the schools supported by public funds, and known as the *provided* schools, were the only ones receiving government aid, while the schools established by different denominations, and known as the *unprovided* schools, contained

## Education

nearly as large a number of pupils. By the new law both classes of schools receive the same support from the government. The county council is obliged to provide as many schools as are necessary in the territory under its jurisdiction and support them from the general fund and local rates. Each school is under the immediate control of a local board of managers, who have charge of the school property and select the teachers. In the schools wholly under government provision, these boards are appointed by the county council, while in the denominational schools a part of the board is appointed by the council and a part by the denomination under whose control the school was established. In the schools wholly under control of the government, religious instruction is prohibited, but in the denominational schools it is given to those pupils whose parents desire it, but is not compulsory. Attendance between the ages of seven and thirteen years is compulsory.

Evening schools, in which industrial training is given, are provided by the government, but on a basis somewhat different from the elementary schools. The secondary schools are not under national control; they depend for their support upon endowments, subscriptions and rates agreed upon by local authorities. For the organization of English universities, see **UNIVERSITY**.

**FRANCE.** The system of instruction in France is more highly centralized and completely organized than in almost any other country. Education is divided into three departments, primary, secondary and higher, all of which are under the direct control of the minister of public instruction, who is appointed by the president and is a member of the cabinet. Under him are three general superintendents, one for each of the departments, and in his department each superintendent has nearly supreme authority. The entire country, including Algiers, is divided into seventeen districts, or academies. The head of each of these districts is the academic chief, or rector, who is assisted by a council of university professors. The primary schools in each academy are under the direction of academic inspectors. Each academy is divided into departments, that is, districts for civil administration, and each department is provided with an inspector, who is under the rector of the academy. Primary schools are required in every commune, and in the communes of more than 500 inhabitants separate schools for boys and

girls must be maintained. Each department is required to maintain a normal school for women and another for men. The inspector is the chief authority in his department.

Formerly, secondary education was almost entirely in the hands of the clergy, but the Church schools have been abolished by national legislation, and government control has been extended to secondary instruction, as well as to that of university grade.

**GERMANY.** In Germany all grades of education are under the control of the government, the minister of public instruction being at the head of the educational system. Three classes of schools are maintained: The primary school, in which attendance between seven and fourteen years is compulsory; the secondary schools, represented by the *gymnasias* and *realschulen*, and the higher institutions, including technical schools and universities. Primary schools are established in all villages and rural communities and are supported by government and local taxation. All teachers are licensed by the government and are required to be graduates of normal schools. Teaching, even in the elementary schools, in Germany is a profession, and one enters upon it with the intention of making it his life work. After serving the required time, the German teacher is retired on a pension. The *gymnasias* are the secondary schools, which give special attention to the ancient classics and fit their students for the classical departments of the universities, while the *realschulen* give attention to modern languages and sciences. Technical schools are numerous and provide for instruction in all lines of skilled labor, as well as in the branches of civil and electrical engineering. For a description of German universities, see **UNIVERSITY**.

**OTHER COUNTRIES.** The Austrian system is patterned after that of Germany and is almost identical with it. Switzerland has no national system, each canton being independent. The common schools of the canton are supported both by general and local taxation. Italy has a state system extending from the elementary school to the university, and this is organized by ample laws providing for the establishing of common schools in all communities, the qualification and licensing of teachers and compulsory attendance, but these laws receive but little attention and are only partially enforced. For this reason the percentage of illiteracy in Italy is very large. In Spain a similar con-

dition prevails. There are ample laws on the statute books, but they receive little attention from either national or local authorities, and common schools are few and in very poor condition. Sweden and Norway have excellent systems of schools, extending from the common schools to the university, all of which are supported by national and local taxation, and education is compulsory as far as the work of the elementary schools goes. For the system in the United States, see **COMMON SCHOOLS**.

**Education Association, NATIONAL,** an association organized at Philadelphia in 1857 as the National Teachers' Association, incorporated in 1886 in the District of Columbia under its present title. For the first few years the National Education Association did not gain great strength, but about 1870, through the division of the association into specialized departments and through the absorption of the American Normal Association and the National Superintendents' Association its effectiveness was greatly increased. There are now seventeen departments, besides an advisory board, known as the National Council. The association holds annual meetings in different parts of the country, at which well-known educators lead in the discussion of all sorts of problems affecting the teacher's calling. The proceedings of the body are published as annual reports. Reports of committees upon special topics are also published under the auspices of the association. The report of the committee of ten upon the course of study in secondary schools, as well as other similar reports, has had great influence in all parts of the country. There are about 10,000 active members in the association and as many more associate members.

**Ed'ward**, called the *Elder* (?-925), king of England, son of Alfred the Great, whom he succeeded in 901. His reign was marked by successes over the Danes.

**Edward**, called the *Martyr* (about 963-979), king of England, son of Edgar, whom he succeeded in 975. His stepmother, desirous of obtaining the crown for her son Ethelred, had Edward put to death.

**Edward**, surnamed *the Confessor* (about 1004-1066), king of England, son of Ethelred II. On the death of his half-brother, Hardicanute the Dane, in 1041, he was called to the throne and thus renewed the Saxon line. He cared little for political matters and spent most of his time in holy works. In 1161 he was canonized.



**Edward, THE BLACK PRINCE** (1330-1376), the eldest son of Edward III of England. In 1346 he commanded part of the forces at the Battle of Crecy and particularly distinguished himself. In 1355 he commanded the army which invaded France from Gascony and won a victory in the great Battle of Poitiers. By the Peace of Bretigny, several provinces of France were formed into a sovereignty for the prince, under the title of the Principality of Aquitaine. When Limoges had been captured by the French, Edward retook the city (1370) and put to death about three thousand of its inhabitants, and this is the greatest stain on his character. After his return to England he opposed his father in many of his oppressive measures.

**Edward I** (1239-1307), king of England, son of Henry III, whom he succeeded in 1272. Before his accession to the throne he had been compelled to put down several revolts in Wales, which had been entrusted to his government. He also took part in a crusade with Louis IX of France, but accomplished nothing of importance. After his accession, he again turned his arms against Wales and finally succeeded in annexing that country to England. During the greater part of his reign he was engaged in a struggle for Scotland, and the choice of him as judge between the rival claims of John Baliol and Robert Bruce gave him a hold on the country. With varying fortunes the struggle continued until 1306, when Robert Bruce, a grandson of the rival of Baliol, was crowned at Scone. Edward started north to subdue Bruce, but died on the way.

Edward was a great king and did much for England in the establishment of order in the country and in the restriction of the power of the clergy. For his influence on the laws of his country he is known as "the English Justinian." The most important event of his reign is the placing in the hands of a Parliament, in which the people of England were to be represented, all power to levy taxes.

**Edward II** (1284-1327), king of England, son of Edward I, on whose death, in 1307, he came to the throne. His weakness and incompetency soon became apparent, and the fact that he was constantly under the dominion of foreign favorites led to numerous revolts. The war which his father had begun against the Scotch, Edward attempted to prosecute, but in 1314 he was completely defeated by Robert Bruce at Bannockburn, and some years later he was com-

pelled to make a most unfavorable treaty with Scotland. He was at length deposed by a conspiracy of his great nobles and his wife, and in 1327 he was murdered.

**Edward III** (1312-1377), king of England, was made king on the murder of his father in 1327. The real power lay with the queen-mother Isabella and Mortimer, her lover, but three years after his coronation Edward banished Isabella from his court, had Mortimer put to death and took the power into his own hands. In 1333 he conducted an expedition against Scotland and won a victory at Halidon Hill, but in his other campaigns against Scotland he accomplished nothing of importance. French interference in favor of the Scotch gave Edward an excuse for invading France, of which he claimed, through his mother, to be the rightful sovereign. His victories in France were remarkable, and his son, the Black Prince, won particular distinction. These victories, however, and even the capture and imprisonment of the French king, John, had no permanent results, and when Edward withdrew from the war, England was in an exhausted condition. The closing years of his reign were disturbed by constant conflict with Parliament and by the desertion of his son, the Black Prince.

**Edward IV** (about 1442-1483), king of England. His father, Richard, duke of York, was the grandson of the fourth son of Edward III, while the rival line of Lancaster descended from John of Gaunt, the third son. Edward, on the defeat and death of his father at the Battle of Wakefield, became the head of the Yorkist party, and having entered London, after his splendid victory over the troops of Henry VI and Queen Margaret, was crowned with acclamation. His hold on the throne was not yet secure, however, and when the powerful earl of Warwick, offended at Edward's marriage, went over to the Lancastrians, Edward was forced to leave the country. In 1471 he landed in England with an army, met Warwick and defeated him and was again proclaimed king. The remainder of his reign was peaceful.

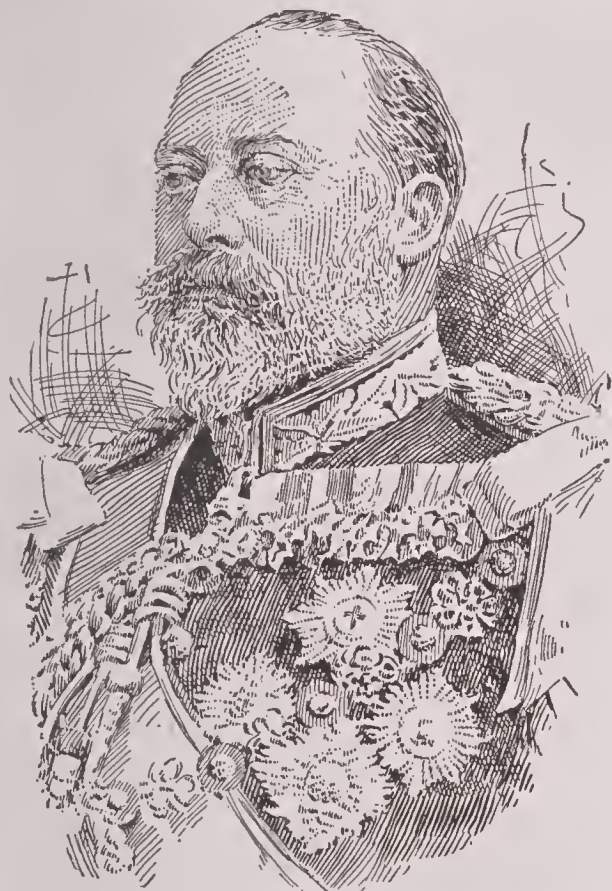
**Edward V** (1470-1483), king of England, son of Edward IV. On his father's death he was crowned king by his uncle, Richard, duke of Gloucester; but Richard denied the legitimacy of the young king and his brother, had them shut up in the Tower and afterward ordered them to be put to death.

**Edward VI** (1537-1553), king of England, son of Henry VIII by his third wife, Jane Sey-



mour. On his accession to the throne, upon the death of his father, his first care was to strengthen and advance the religious reforms instituted during his father's reign. Edward was himself too young to have much influence in affairs, and the chief power during his reign lay, first with his uncle, Edward Seymour, and later with the earl of Warwick.

**Edward VII** (1841-1910), king of the United Kingdom of Great Britain and Ireland and emperor of India, the eldest son of Queen Victoria and Prince Albert, born at Buckingham Palace, November 9, 1841. He inherited the title of Prince of Wales and was christened Albert Edward. He was educated at Christ's



EDWARD VII

Church College, Oxford, and Cambridge University. In 1860 he visited Canada and the United States, where he received a most cordial welcome. Two years later, in company with Dean Stanley, the young prince made an extensive journey through Egypt, Palestine and India. In 1863 he married Princess Alexandra, daughter of Christian IX of Denmark, by whom he had six children: Albert Victor, duke of Clarence, who died in 1892; George, duke of Cornwall and York, later George V; Louisa, duchess of Fife; Victoria; Maude and Alexander John, who died in 1871.

Although during the reign of Queen Victoria Edward had little or no part in state politics, he made frequent visits to the leading courts of Europe. He likewise was a close student of the politics of the world, and when he became king he astonished all but those intimately acquainted with him by his tact and sagacity in diplomatic affairs. His reign was characterized by the negotiation of treaties which placed Great Britain in friendly relations with the leading nations of the world. The most notable were the alliances with Japan, France and Italy, and the understanding with Russia. These treaties not only changed the position of Great Britain from that of isolation in which she took pride during Victoria's reign, to that of friendly coöperation with other nations; but they have also exerted a strong influence in maintaining the peace of the world. As a ruler and a diplomat Edward was trusted alike by his subjects and by foreign nations with possibly the exception of Germany, and his influence was such that he became known as the Peacemaker.

**Ed'wy** (?-959), king of England, son of Edmund I. He succeeded his uncle Edred in 955. Taking part with the secular clergy against the monks, he incurred the confirmed enmity of the latter. The papal party, headed by Dunstan, was strong enough to excite a rebellion, by which Edwy was driven from the throne, to make way for his brother Edgar.

**Eel**, a long, slimy, usually scaleless, or almost scaleless, snake-like fish. Eels are sluggish during the day, but become quite active by night, sometimes crawling considerable distances on land through the damp grass. They are good food-fish, though some people are prejudiced against them because of their repulsive appearance. There are a number of species, of which the commonest are the fresh-water eels, living on both sides of the Atlantic, in fresh-water streams for most of the year, but going to the sea to lay and hatch their eggs. See CONGER EEL; ELECTRIC FISH.

**Eg'bert** (?-839), considered the first king of all England, was of the royal family of Wessex. He became in 802 king of Wessex, and before 830 he had reduced the other kingdoms and rendered them dependent on him.

**Egg**, the cell and accompanying products from which develop animals similar to the parent which produced the egg. In the higher animals the period of egg development is long, and often the egg is retained in the body until it is hatched, and the young are partially matured, but in



## Egg

more numerous cases the animals lay their eggs to be hatched subsequently. A complete egg consists of four parts, the shell, the white, the yolk and the embryo. The eggs of lower animals and insects are imperfect, but all contain the embryo. The eggs of frogs and fish are deposited in large numbers in the water and are held together by a jelly-like fluid (See SPAWN). Some species of insects lay a large number of eggs and cover them with a fluid resembling varnish, which protects them from the weather and from other enemies.

The eggs of birds are the most perfect and of the most general interest. The shell is composed almost wholly of carbonate of lime and has for its purpose the protection of the parts which it encloses. Just within the shell is a thin, tough membrane, which forms the lining. Next to the lining, and surrounding the yolk, is the white, which is composed almost wholly of albumen. The yolk is also inclosed in a thin membrane and is spherical. It is composed of a variety of substances, some of which contain margarine and oleine; its color is usually yellow. The germinal vesicle, or germ spot, is found within the yolk, and in the eggs of fowls it can be easily distinguished by its pearly-white appearance. It is from this that the young bird or chick is developed by incubation, the yolk and white serving for food during the process. In the large end of the egg there is a space between the lining and shell that is filled with air. As the egg grows old this increases in size. It is supposed by some that the air in this space is used by the chick while it is pecking out of the shell.

The germ is developed by heat, which is supplied by the female's sitting on the nest. The eggs of fowls and most birds require a temperature of 104° F. for successful incubation. The period of incubation varies with the species. The eggs of the white-eyed vireo require only seven days in which to hatch, while those of the common fowl require three weeks, and those of the turkey and most water fowl require four weeks.

The number of eggs laid by different birds also varies with the species. Some birds lay only one during the year, and others, as the hen, lay a large number. The robin usually lays four, the swallow from four to six and the crow four, six or seven. In many instances the color and shape of the egg are closely associated with the habits of nesting. Birds which lay their eggs on the ground without constructing any

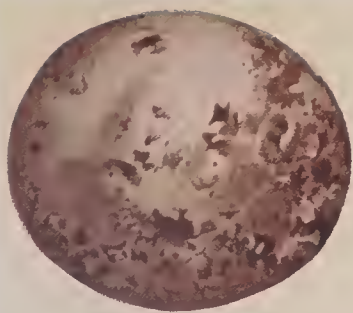
## Eggplant

nest, lay an egg which is rounded at one end and nearly comes to a point at the other. If blown by the wind these eggs roll round in a circle, while if they were oval, like those laid in deep nests, they could easily be blown away. (Compare in the *color plate* accompanying the article BIRDS, the eggs of the spotted sandpiper and the tern with those of the sparrowhawk and the crow.) Eggs laid on the ground, or in nests built on the ground, usually take the color of the pebbles or dead grass with which they are surrounded, while the bright colors belong to the eggs laid in well-constructed nests. Another peculiarity of the coloring is that the greatest variation is about the large end of the egg. (See in the *color plate* accompanying the article), the eggs of the wood peewee, bobolink, purple grackle, meadowlark and other birds.)

The economic use of eggs is well known, and the eggs of the hen, the guinea fowl, turkey and domestic duck constitute an important item in the world's supply of food. In Labrador, the Orkney and Shetland islands and some other localities, the inhabitants collect the eggs of sea birds for food.

**Eggleston**, EDWARD (1837-1902), an American novelist and historian, born at Vevay, Ind. His education consisted of a knowledge of Latin and some Greek and an extensive acquaintance with the French language and literature, all gained largely through his own efforts. When nineteen years old he became a Methodist circuit rider and preached for ten years. His literary career began in 1866, as editor of the *Little Corporal*, at Evanston, Ill. In 1870 he became literary editor of the *Independent*, in New York City, and some time later he gave up that position to become editor of *Hearth and Home*. From 1874 to 1879 he preached in Brooklyn, and from the latter date he devoted himself to literary work. The purpose of his novels was to do "something toward describing life in the back country districts of the Western states," and the scenes of his most popular novels were laid in southern Indiana. Among his novels are *The Hoosier Schoolmaster*, *The End of the World*, *The Circuit Rider*, *Roxy*, *The Hoosier School Boy* and *The Graysons*. He wrote also *A Household History of the United States* and other works on United States history, which are of importance.

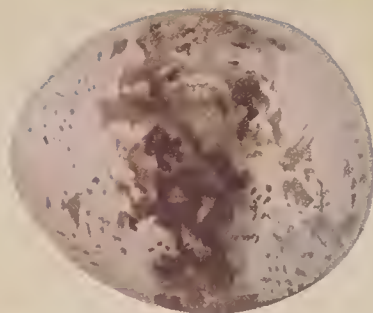
**Eggplant**, a plant belonging to the same family as the potato, bearing a fruit that in some species resembles a hen's egg. Several varieties of this fruit are cultivated in the United



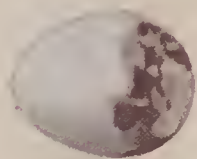
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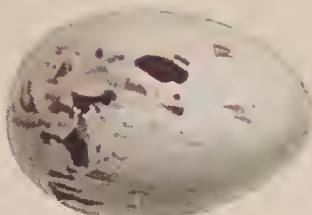
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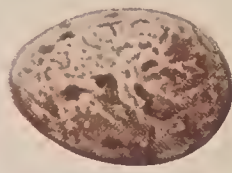
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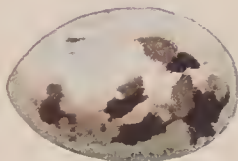
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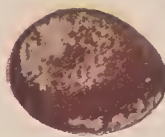
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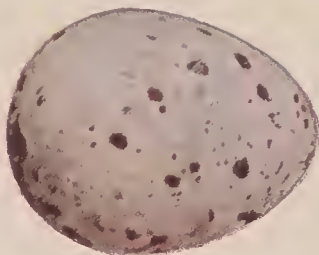
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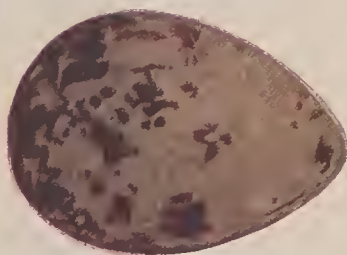
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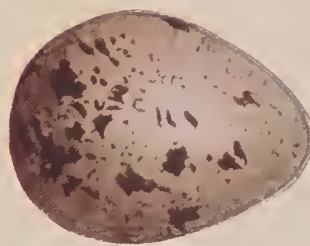
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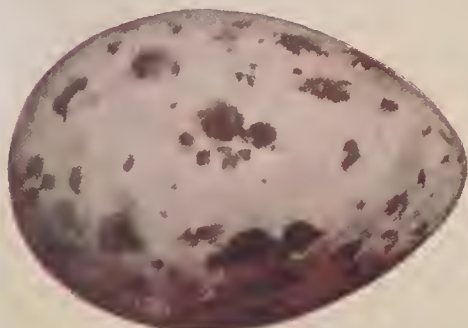
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21

## BIRDS' EGGS

### Birds of Prey

### Perchers

- 1, Sparrow Hawk. 4, Wood Pewee. 9, Kingbird.  
 2, Screech Owl. 5, Meadow Lark. 10, American Crow.  
 3, Sharp-Shinned Hawk. 6, Yellow-Billed Cuckoo.  
 7, Bobolink. 11, Humming Bird.  
 8, Purple Grackle. 12, House Wren.

### Climbers

- 13, Red-Headed Woodpecker.

### Scratchers

- 14, Gambel's Partridge.  
 15, Hen's Egg.

### Waders

- 16, Spotted Sandpiper.  
 17, Green Heron.  
 18, Semipalmated Sandpiper.

### Swimmers

- 19, Gull. 20, Duck. 21, Tern





## Egmont

States and in other parts of the world, where it is used as a table vegetable. In the United States the purple-fruited species are favorites.

**Egmont** or **Egmond**, **LAMORAL**, Count (1522-1568), a Flemish statesman and general, born in Hainaut. He succeeded to the family title and estates in 1541 and fought in the campaigns of Charles V in Algeria and against Francis I of France. He was rewarded with high honors and with responsible offices under the emperor. When Margaret of Parma became regent general of the Netherlands, Egmont joined William of Orange in opposing her Catholic policy. When rebellion finally broke out, however, Egmont for a time remained neutral and refused to follow the prince of Orange and other leaders into voluntary exile. Suddenly he was seized by royal officers and imprisoned at Ghent, condemned to death and executed with Count Hoorne in 1568 in the public square at Brussels. Egmont is the hero of one of Goethe's greatest tragedies.

**Egoism**, a term derived from the Greek and Latin word *ego*, meaning *I*, and used in philosophy in two senses. In its earliest application, egoism meant the theory that nothing except one's own self can really be known; but modern and much more common usage applies it to any system in ethics which sets up the happiness of the individual himself as the justifiable end of his own acts and purposes. In this latter sense it is the opposite of *altruism* (which see). The two theories, however, overlap at many points, and cannot be classed as absolutely distinct systems of philosophy.

**E'gret**, a name given to those species of wood herons which have the feathers of the

## Egypt

seasons of the year. The egrets are more graceful than the common heron, and the American species is about thirty-seven inches long, has soft plumage, a smooth head and twelve trailing feathers. The egrets have been so much hunted for their white flowing plumes, which women prize for ornament, that they are rapidly being exterminated.

**Egypt**, *e'jipt*, a country in the northeastern part of Africa, extending from the Mediterranean Sea to the 22nd degree of north latitude and from Syria on the east to Tripoli on the west. The northern boundary is the Mediterranean Sea; the eastern, Syria and the Red Sea; the southern, an arbitrary line drawn from the Red Sea to a point about 200 miles west of Wadi Halfa. From here a northwest line extends to the southeastern point of Tripoli; thence the boundary extends due northward to the Mediterranean. The minor coast waters include the gulfs of Suez and Akabah, between which is the Sinai peninsula. The extent of the country from east to west and from north to south is about equal, being nearly 490 miles, and the area within the boundaries described is 400,000 square miles, or a little more than twice that of Montana, though the government extends over Egyptian Sudan and a vast area to the west, known as the Libyan Desert. Within the area of Egypt proper only about 13,000 square miles are subject to cultivation.

**SURFACE AND DRAINAGE.** Historically and geographically Egypt is divided into two parts: Lower Egypt, extending from the Mediterranean to Cairo, and including what is known as the Delta Region; and Upper Egypt, extending from Cairo to the southern boundary. The Delta Region is nearly triangular in shape. Its greatest extent from east to west is about 150 miles, and from north to south, 120 miles. This consists entirely of land made by the silt deposited from the river; it is low and level, contains many branches of the river, as well as numerous canals, and is very fertile. Within this region the greater part of the population of the country lives. The habitable portion of Upper Egypt consists of the valley of the Nile, which varies in width from 15 miles, north of Cairo, to about 2 miles, farther up the stream. To the east of the Nile is a hilly and mountainous country, generally known as the Arabian Desert, but it should not be confounded with the desert of the same name in Asia. This region rises gradually by successive elevations until the highest altitudes are found on the borders



EGRET

lower part of the back elongated, reaching to the end of the tail, or even beyond it at certain



of the Red Sea and attain about 7000 feet, though the average altitude is much less than this. The surface is characterized by sand and barren rocks, and nearly all of the region is devoid of vegetation, except in a few places where there is sufficient moisture to afford scanty support for the flocks of the Bedouins. To the west of the Nile is the great Libyan Desert, a sandy plain which is nearly level, but has in a few places depressed areas, whose surface is below the level of the sea. Most of these depressions are watered from subterranean sources or by canals leading to them from the Nile, and they constitute the oases of the desert; some of them are very fertile and all are under the government of Egypt.

**MINERAL RESOURCES.** The most important minerals are building stone, consisting of granite, porphyry, limestone and sandstone. Of these the granite found near Syene, from which it was named syenite, is the most durable and has been known for the longest time. It was from these quarries that most of the rock for the great pyramids and for many of the ancient temples was obtained. The other stones are also valuable building stones and are now used to a considerable extent. Because of the drifting sands, many deposits of minerals are undoubtedly covered. Engineers who have recently examined the country report that possibly gold mining can be made profitable along the beds of certain dry streams and in other localities, though there has been no attempt at working the deposits.

**CLIMATE.** Egypt is a land of clear skies and dry atmosphere. On the Mediterranean coast about 8 inches of rain falls during the year, while at Cairo the rainfall never exceeds  $1\frac{1}{2}$  inches, but at the extreme south there is a considerable rainfall. Less than one-fifth of the days are cloudy. Lower Egypt has a more even temperature than the desert region, removed from the influence of the sea. At Alexandria the temperature seldom reaches freezing point, but in the hot season, during the period of khamsin, it may reach as high as  $110^{\circ}$  or  $115^{\circ}$ . During the fall and winter the prevailing winds are from the north and north-west, while in the spring and summer they are from the south. April and May are characterized by the khamsin, which produces a high temperature and fills the air with sand (See **KHAMSIN**). The inhabitants divide the year into three seasons: the period extending from November to March; the summer, from March

to June, and the period of inundation, from July to November.

**INDUSTRIES.** Agriculture is the chief industry of the country and affords employment to more than two-thirds of the people who have a fixed occupation. The most important food plants are the date palm, wheat, rice, millet, vegetables and sugar cane. Besides these, various tropical and semi-tropical fruits are raised. Agriculture depends entirely upon irrigation and can be practiced only where water is obtainable. Because of this, the valley of the Nile is the only habitable portion of the country. The Delta Region is provided with irrigation throughout the year, and here three crops can be grown. Of these, wheat and other cereals are raised between November and March, at the time when water is the most plentiful; cotton and sugar cane mature between March and June, and maize and vegetables during the other months of the year. The soil is exceedingly fertile, and notwithstanding the primitive methods of cultivation, excellent crops are obtained. Since the construction of the barrage across the Nile at Cairo to raise the water in the river, a much larger area of the lower land is subject to irrigation, while the construction of the great dam at Assuan regulates the supply of water for the year (See **ASSUAN**; **IRRIGATION**). Most of the land is rented by those who work it.

Manufactures are comparatively unimportant, and the only manufactured article having any considerable export is cigars. Tobacco might be raised in the country, but since 1890 its production has been prohibited by the government, because the quality grown is inferior to that imported from Turkey, and its use would curtail the demand for Egyptian-made cigars. In Lower Egypt there are a few sugar refineries and a number of cotton mills.

**TRANSPORTATION.** The Nile is navigable for small steamers as far as the first cataract, which is just north of the southern boundary. The country contains 1400 miles of railway, which is owned and operated by the government, and about 800 miles of so-called agricultural roads, operated by private corporations. These roads connect the agricultural regions with the main lines of railway and provide transportation for the produce of the country. The northern division of the Cape-to-Cairo railroad has been constructed as far as Khartum, about 1200 miles south of Cairo. Telegraph communication between the principal cities and with other countries is complete and a fairly good postal

system is maintained. The commerce of the country is comparatively small and is confined to the necessities of the population. The imports consist of manufactured goods, particularly textiles, some food products and machinery, while the exports consist of cigars, cotton and sugar. Egyptian cotton is of the long staple variety (See COTTON) and finds a ready market at high prices in England and other cotton manufacturing countries.

**INHABITANTS.** The great bulk of the population consists of Egyptians; the lower class are styled *fellahs* and constitute by far the majority of the people. In the towns are found many Arabians, Bedouins and Copts, while the foreign element includes Greeks, Italians, English, French, Russians, Germans and some nationalities from Asia. In the rural districts and smaller towns the inhabitants are almost wholly Egyptian, while in Alexandria and Cairo the foreign element is in the ascendancy.

**GOVERNMENT AND RELIGION.** The government is an hereditary monarchy, and the ruler is styled the khedive. Theoretically the powers of the ruler are absolute, but practically they are much curtailed. He is assisted by a council of state, composed of six ministers, who have charge, respectively, of the departments of interior, finance, justice, war, public works and public instruction, and foreign affairs. Theoretically, Egypt is tributary to Turkey, and the government pays the sultan a fixed sum, but practically Egypt is a British dependency. Because of French and British financial interests in the country, the governments of these two countries jointly assumed control of the finances of the Egyptian government in 1879, but in 1883 the control passed to Great Britain, which placed a financial agent in Egypt, and the powers of this agent have been gradually extended until now he is practically at the head of the government.

In religion nearly all of the people are Mohammedans. A few of the Copts belong to the Abyssinian Church, and in the large towns are found adherents of the Roman Catholic and other forms of Christian faith, but these are nearly all among the foreigners.

**CITIES.** The important cities are Cairo, the capital; Alexandria, the principal seaport; Rosetta and Damietta, at the mouths of the Nile, and Suez and Port Said, at either end of the Suez Canal. See ALEXANDRIA; CAIRO; SUEZ CANAL.

**HISTORY.** The Egyptians are the earliest people known to us as a nation. By the beginning of the fifth century B. C., they were living under a settled government; they had built cities, invented hieroglyphic signs and improved them almost into an alphabet. The arrangement of the Egyptian chronology is still a much disputed point among scholars. A list of the kings, arranged in thirty dynasties, was made by the priest Manetho in the third century B. C., and this division is still used. The fourth dynasty, distinguished as the "Pyramid Dynasty," was the most important in early Egyptian history. It was at its height about 2700 or 2800 B. C. and left as its monuments the greatest of the pyramids (See PYRAMIDS). The twelfth dynasty, which seems to have begun about 2000 B. C., exercised a just and able rule over a prosperous country. Literature especially flourished during this period. About 1700 B. C., Egypt was conquered by a people whose rulers were called the Hyksos, or Shepherd Kings. Nothing is known of these people, except that they had first conquered western Arabia and Syria. The Theban princes seem to have preserved a state of semi-independence under the Hyksos rulers, and at last a revolt arose which ended by the Shepherd kings being driven out of Egypt by the Theban princes about 1600 B. C. With the expulsion of the Shepherd kings began the reigns of those great Theban kings who built the magnificent temples and palaces at Thebes.

The nineteenth dynasty began with Rameses I. Seti I, the successor of this Rameses, began a war against the Hittites, which was continued under his successor and grandson, the great Rameses II, or Sesostris. Until recently it was believed that Rameses II was the Pharaoh who had oppressed the Hebrews, and that the Exodus occurred under his successor, Menephtah. Under the later kings of the nineteenth dynasty, the Egyptian empire began to decay. The twentieth dynasty began with Rameses III, a strong king, who was followed by a succession of weak rulers, dependent for the most part on their priests. A priest dynasty, the twenty-first, came to the throne with Herhor. He attempted to restore Egyptian rule in the East and conquered Jerusalem. After his death Egypt was torn by civil war, and eventually the Ethiopians conquered it. In 525 B. C. Cambyses, king of Persia, overran Egypt and made it a Persian province. After the Persian defeat at Marathon, the Egyptians arose and



recovered their independence for a short time, but were again subdued; and in spite of two other revolts, Egypt remained a Persian province until Persia itself was conquered by Alexander the Great in 332 B. C.

Egypt now became a Greek state, and the Egyptians were treated as an inferior race. Alexandria was founded as the new Greek capital. On Alexander's death, his general, Ptolemy, took possession of the throne and became the first of a Greek dynasty that for three hundred years made Egypt one of the chief kingdoms of the world. The Ptolemies were patrons of letters and art, and Theocritus, Callimachus and Euclid flourished under their rule. But while the Alexandrian Greeks managed to keep down the native Egyptians, they were themselves coming under Roman influence. The later Ptolemies were obliged to ask the help of Rome in internal and external troubles, and Cleopatra maintained her power only through her personal influence with Julius Caesar and Mark Antony. On the defeat of Antony by Augustus in 30 B. C., Egypt became a province of Rome. It was still a Greek state, however, and Alexandria was the chief seat of Greek learning and science. Gradually the old Greek and Egyptian religions gave place to Christianity, and this is perhaps the most important event in Egypt during the Roman rule.

On the division of the Roman Empire, in the time of Theodosius, into the Western and Eastern empires, Egypt became a province of the latter and sank deeper and deeper into barbarism and weakness. It was conquered in 640 A. D. by the Saracens, under Caliph Omar. Of the Saracen rulers who made Cairo practically the center of Mohammedan influence, the greatest was Saladin. The last Saracen dynasty was overthrown by the Mamelukes in 1250, and the Mamelukes in their turn were conquered by the Turks in 1517. They made repeated attempts to cast off the Turkish yoke, and they had virtually done so by the end of the eighteenth century, when Napoleon conquered Egypt. The French held it till 1801, when they were driven out by the Turks, with the aid of the British.

On the expulsion of the French, a Turkish force took possession of the country, and Mehemet Ali was made pasha. He was a man of great ability, administered the country vigorously and greatly extended the Egyptian territories. At length he rebelled against the porte, and, after gaining a decisive victory

over the Ottoman troops in Syria, was acknowledged by the sultan as viceroy of Egypt, with the right of succession in his family. Mehemet Ali died in 1849 and was succeeded by his grandson Abbas Pasha, who in his turn was succeeded by his uncle Said Pasha, the son of Mehemet. Under the rule of Said Pasha railways were opened and the cutting of the Suez Canal was begun. After Said's death, Ismail Pasha, a grandson of Mehemet Ali, obtained the government (1863). His administration was vigorous, but exceedingly extravagant, and brought the finances of the country into great disorder. In 1866 he received permission from the sultan to adopt the title of khedive. In 1879 he was forced to abdicate under pressure of the British and French governments and was replaced by his son, Tewfik. The so-called national party revolted in 1882 and forced the khedive to flee, but on July 11 a British fleet bombarded Alexandria and restored him. From this time on, although the khedive remained the nominal head of the government, Egypt became practically the protectorate of Great Britain.

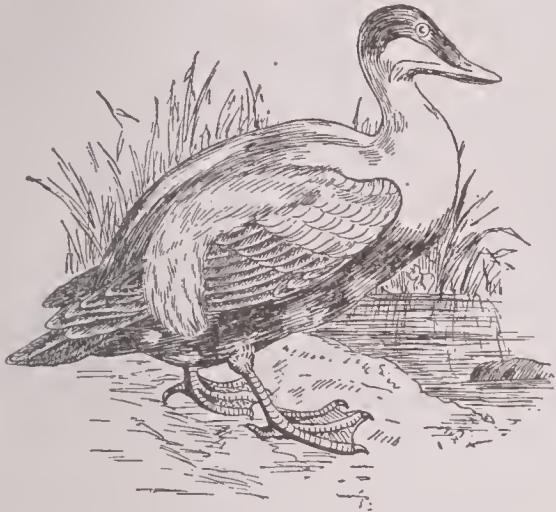
A rebellion in the Sudan, under the leadership of the Mahdi, now gave the government trouble. (See Mahdi.) Troops were sent under General Gordon to protect the British interests, but the Mahdi's forces were strong enough to shut General Gordon up in Khartum. For nearly a year he held the town, but he was killed (January 18, 1885) before the relief expedition under Wolsely could reach him. When the expedition withdrew, the Sudan was left in a state of anarchy. In 1896 the Mahdi again threatened Egypt, and the British government again took steps to suppress him. Sir Herbert Kitchener was made commander in chief of the Egyptian army, and in 1898 he won a final victory, which once more brought the Sudan under the rule of the governments. In 1892 Tewfik was succeeded by his son, Abbas Hilmi, an able ruler. Population in 1897, 9,734,405; in 1907, 11,189,978.

**Egyptian Architecture.** See ARCHITECTURE.

**Ehrenbreitstein**, *a'ren brite'stine*, a Prussian fortress of great strength, situated opposite the confluence of the Moselle with the Rhine on a precipitous rock 400 feet above the river, inaccessible on three sides. The fortifications, which were erected in 1816-1826, at a cost of \$6,000,000, accommodate a garrison of 14,000 men and possess room for stores to last an army of 60,000 for a year. Population in 1910, 6,000.

## Eider Duck

**Eider, i'der, Duck** a species of duck found both in America and Europe. Its favorite haunts are solitary rocky shores and islands. The eider duck is about twice the size of the common duck. The male is mostly black, but has a white back and head, with a black crown. The female is reddish drab, spotted with black, and has two white bands on the wings. The nests are usually formed of drift grass and dry seaweed and are lined with a large quantity of down, which the female plucks from her own breast. One female generally furnishes



EIDER DUCK

about a half-pound of down. This down, from its superior warmth, lightness and elasticity, is in great demand for beds and coverlets; and the districts in Norway and Iceland where these birds abound are guarded with the greatest vigilance as a most valuable property. As found in commerce, this down is in balls of the size of a man's fist. It is so fine and elastic that five pounds of the best quality are sufficient for a whole bed.

**Eiffel, i'fel, GUSTAVE** (1832- ), a celebrated engineer, born at Dijon, France. He first attracted attention by the construction of a bridge, in which was employed for the first time the compressed air method of sinking foundation cylinders. This was followed by many other works of great engineering skill. The most important among these, and the one which has made his name famous throughout the civilized world, is the Eiffel Tower of the Paris Exposition of 1889. Mr. Eiffel was made an officer of the Legion of Honor in recognition of his genius. In 1893 he was connected with the Panama scandal, and was convicted of misappropriating funds of the canal company. For this he was sentenced to fine and imprisonment.

## Ekaterinburg

**Eiffel Tower**, a remarkable tower erected in the Champs de Mars in Paris and named from its projector, Gustave Eiffel. The tower was completed in 1889 and was designed as the leading architectural feature of the Paris Exposition of the following year. Its base is 330 feet square, and the support is four iron columns which rest upon massive masonry. The height is 984 feet, and there are platforms at 189 feet, 380 feet and 906 feet, which can be reached by elevators and by stairs. The first platform contains restaurants, and the third is partially devoted to an experiment station of the weather bureau of France. The tower contains 7300 tons of iron and steel and cost over \$1,000,000.



EIFFEL TOWER

**Eight-hour Day.** The trade unions in England and America have long demanded the passage of laws limiting the hours of labor in a single day to eight. This proposal was first made as early as 1833 and has since been vigorously supported. In England the agitation has failed to accomplish any important results, but in the United States all government work is carried on on this basis, and eight-hour days are in force to a greater or less extent in at least a dozen states. On the continent of Europe the eight-hour day has been one of the ideals of the socialists, but, except in Germany, the movement has made little headway. In Australia, however, for many years, laws limiting the day's work to eight hours have been in force. See LABOR ORGANIZATIONS.

**Eisleben, ise'la ben**, a town of Prussian Saxony, 18 mi. w. of Halle, celebrated as the place where Luther was born and where he died. There are many memorials of Luther and also a bronze statue of the reformer, erected in 1883. Copper is extensively worked in the neighborhood. Population in 1910, 28,900.

**Ekaterinburg, ya kah'ta ren boorg'**, or **Yekaterinburg**, a fortified town of Russia, in the Province of Perm, on both banks of the Isset, 180 mi. s. e. of Perm. It is the center of the mining district of the Ural region; and



## Elam

gem-cutting, making of machinery, cloth and candles are industries. Population, 55,500.

**E'lam**, the ancient name of a country or region in Asia, east of the Lower Tigris. A king of Elam is said in the cuneiform inscriptions to have conquered Babylonia and Assyria about 2300 B. C. The country was later incorporated in the Persian Empire.

**E'land**, the largest of all the antelopes, about the size of an ox. Its flesh, especially that of the thighs, is highly prized, when dried. Consequently, the animal is nearly exterminated



ELAND

in the neighborhood of Cape Colony, where it was once common. The color is a light or grayish brown. The eland possesses a short mane and fine spreading horns, that are about eighteen inches long and nearly straight. See ANTELOPE.

**Elasticity**, *e'las tis'i ty*, the property of matter by virtue of which a body is enabled to resume its original form when the outside force by which that form has been changed is removed. Nearly all substances are elastic, but some are much more so than others. Gases are the most elastic, and liquids the least. Hard solids, such as iron, steel and marble, are more elastic than soft ones like dough, putty and lead. Whenever a substance is compressed or extended beyond the limit of its elasticity, it will not resume its former shape. This is often illustrated by rubber bands that have for some time been stretched to a high degree of tension. Such bands lose their elasticity. By compressing gases with a sufficient force, most of them can be changed into liquids. In some instances these liquids return to the gaseous form as soon as the pressure is removed, while in others they

do not. The elasticity of torsion, or twisting, illustrated by twisting a cord or wire, is considered the most delicate measure of force and is employed in the most sensitive scientific instruments, such as the galvanometer.

**El'ater**. See CLICK BEETLE.

**El'ba**, a small island in the Mediterranean, in the province of Leghorn, Italy, separated from the mainland by the Strait of Piombino, about 6 miles wide. This island is 18 miles long and from 3 to 10 miles broad and is traversed by mountains, which rise to a height of over 3000 feet. It is rich in iron, marble, granite and salt, and iron ore is exported. Excellent wine and fruits are produced. It has two seaports, Porto Ferrajo, the capital, and Porto Longone. The Treaty of Paris in 1814 erected Elba into a sovereignty for Napoleon, who resided in it from May 4, 1814, to February 26, 1815.

**El'be**, a river of Germany, one of the largest in Europe. It rises on the slopes of the Schneekoppe, one of the highest summits of the Riesengebirge, between Bohemia and Silcsia. The length, including windings, is about 780 miles. Its chief affluents are the Moldau, Eger, Saale, Mulde and Havel. It is navigable from its confluence with the Moldau in Bohemia; its estuary at Cuxhaven is much encumbered with sand banks. The chief cities on its banks are Dresden, Torgau, Wittenberg, Magdeburg and Hamburg.

**El'berfeld**, a town of Rhenish Prussia, 15 mi. e. of Düsseldorf. Its prosperity, which is of recent date, is largely due to the cotton manufacture. Linen, woolen, silk and mixed silk goods, ribbons and velvet are extensively made and exported. There are numerous mills for spinning cotton twist, linen yarn and worsted, besides numerous dyeworks and miscellaneous industrial establishments. The commerce is extensive, and Elberfeld is an important railway center. Population in 1910, 170,118.

**El'bing**, an important commercial seaport town of West Prussia, on the Elbing, near its entrance into the Frisches Haff. It was once a flourishing Hanse town, and it still has an extensive industry and trade, the manufactures including iron goods, machinery, brass and tinplate goods. It has also ship-building yards. Population in 1910, 58,631.

**Elburz**, *el boorz'*, a lofty mountain range, extending over northern Persia, parallel with, and overlooking, the Caspian. The highest peak is Mount Demavend, 18,500 feet; the average height of the range is 6000 to 8000 feet.

**El Caney**, *el kah'na e*, BATTLE OF, a battle of the Spanish-American War, fought July 1, 1898, between 4500 Americans, under General Lawton, and about 500 Spaniards, well-entrenched, under General Vara de Rey. The battle was one of the few important land contests of the war, was fought desperately and caused a loss of more than 400 men on each side. The Americans won the day.

**El'der**, a name given to several species of small trees or shrubs, which have opposite, pinnated leaves and bear small white flowers in large, conspicuous, flat-topped clusters. The berries are black or red in color and somewhat bitterish in taste, though they are sometimes used in making pies and a kind of wine. Some varieties are cultivated because of their beautiful foliage and handsome shape. The branches are woody on the outside, but the whole center is filled with a white pith. The wood of the European species is tough and hard and takes a good polish.

**El'don**, LORD (John Scott) (1751-1838), a lord high chancellor of England, one of the most famous of English jurists, born at Newcastle-on-Tyne, June 4, 1751. He was educated at Oxford, where he gained high honors. He was admitted to the bar in 1776 and soon rose in his profession, becoming member of Parliament in 1783. There he gained influence by his intellectual and moral force and was knighted in 1788 and made solicitor-general. Eleven years later he became chief justice of the court of common pleas and was made a peer, with the title of Baron of Eldon. In 1801 he was appointed lord chancellor of England, an office which he held until 1827, with one brief intermission. During that period he possessed immense influence with the ministry and monarchs. He resigned in 1827 and retired to private life. He is recognized as one of the greatest of common law judges.

**El Dorado**, *el do rah'do*, a term applied first to a king of South America who was said to have covered his body annually with gold dust and to have bathed in a sacred lake. The term was then applied to a fabled gold city, and then to a country reputed to have been immeasurably rich. The Spaniards spent large sums of money in exploring expeditions to discover the city and country. The most noted of these were those of Diego de Ordaz in 1531, whose lieutenant, Martinez, claimed he had been in the golden city, called Omoa, and of Orellana, ten years later. The name is now used to designate any place of fabulous wealth.

**El'ecampane'**, a plant of the natural order Compositae, found in the United States, Europe and Asia. It is three or four feet high and has root leaves often two feet or more in length. The flowers are large and yellow, and the root, which is perennial, possesses a bitter, camphor-like taste.

**Elec'tion**, in politics, the selection by voting of a person or persons to occupy some post or office. The most important elections are those of the members of the legislative assemblies of the different countries, and these are regulated by strict laws. In such elections voting by ballot is now general (See BALLOT). Federal jurisdiction of elections in the United States extends to the elections of such officers of the Federal government as are elective, namely, the president, vice-president and members of the House of Representatives. The election of officers of the state and local governments is regulated by the several states. The president and vice-president are elected by a college of electors (See ELECTORAL COLLEGE). Each state is entitled to two senators in Congress, who are elected by the legislatures of the several states; members of the House of Representatives are elected directly by the people. All citizens of the United States are entitled to vote except citizens of the District of Columbia. The constitutions of the several states grant to certain citizens the right of suffrage. The laws of each state prescribe the qualifications of voters, which vary somewhat in the different states. The following qualifications may be classed as universal: That the elector shall be over twenty-one years of age, neither lunatic nor pauper, and prepared to take, if necessary, an oath of allegiance to the Federal government. The length of residence required for voting in the state varies in the different states. Property qualification is required only in Rhode Island. Some of the states require an ability to read and write. Wyoming, Colorado, Utah, Idaho, California, Oregon, Arizona and Kansas extend the suffrage, with the right to hold office, to women. In Illinois women may vote for president and local officers such as mayors, but not for senators, representatives or state officers. See WOMAN SUFFRAGE.

**Elective Studies**, a term that has come into common use in recent years to indicate courses of study in American schools and colleges which may be chosen, or elected, by undergraduate students. The development toward election has been slow, and there have been notable reactionary movements, but few institu-



## Electoral College

tions now adhere absolutely to one unchangeable curriculum. The advantage of the elective system is the freedom which it gives students to develop along the lines of their special strength or inclination. The danger lies in abuse of this freedom—the election of courses that are easy but have little disciplinary or instructional value. To obviate this disadvantage, several methods have been used, such as the division of the courses into groups, each student being required to choose a certain amount of work from each of these groups, and the assignment of members of the faculty as advisers to the students. Practically all of the state universities now have the elective system, and most of the new privately endowed institutions, as well as some of the older ones, are rapidly extending their elective courses.

**Electoral College**, in the United States, a body of men who are chosen by the people of the several states to elect the president and vice-president. The number of electors chosen by each state is equal to the whole number of members that the state sends to both houses of Congress. No senator or representative or person holding an office of profit or trust under the United States can be chosen as an elector. The day on which electors are chosen must be the same in all states—the Tuesday next after the first Monday in November. The electors meet in their respective states on the second Monday in January and vote by ballot for president and vice-president. They then make distinct lists of all persons voted for as president and vice-president, and of the number of votes for each; these lists they sign, certify and transmit, sealed, to Washington, directed to the president of the Senate, who opens them in the presence of both houses of Congress, on the second Wednesday of the succeeding February. A majority of the whole number of electoral votes is necessary to elect. If no candidate has a majority of votes, the House of Representatives must choose one of the three persons having the highest number of votes. The electors no longer use discretionary powers, as planned by the Constitution makers, but cast their votes for the candidates previously nominated by their respective parties.

**Electoral Commis'sion**, a commission appointed by an act of Congress, January 28, 1877, to investigate the returns of electoral votes from Florida, Louisiana, Oregon and South Carolina and to determine the presidential election of 1876. The commission numbered fifteen mem-

## Electric Battery

bers, consisting of three Republican senators, two Democratic senators, three Democratic representatives, two Republican representatives and five associate justices of the Supreme Court. It was soon apparent that the commission was evenly divided between the two parties, with the exception of the fifth justice, Bradley, who had taken the place of Justice Davis of Illinois. However, he cast his vote with the Republican members and decided against the Democratic claim that the commission should go behind the returns and investigate charges of fraudulent voting and manipulation of returns. This point being determined, the commission in every case sustained the validity of the Hayes electors, thus deciding the election in favor of Mr. Hayes and against Mr. Tilden. See UNITED STATES OF AMERICA, subhead *History*; HAYES, RUTHERFORD BURCHARD; TILDEN, SAMUEL JONES.

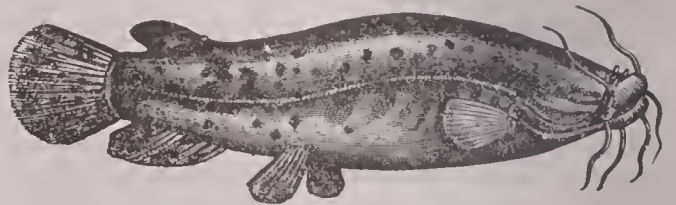
**Electors**, GERMAN IMPERIAL, those German princes who had a voice in the election of the German emperor (See GOLDEN BULL). Originally the number was seven, but in 1648 it was increased to eight and in 1692 to nine.

**Elec'trical Fishes**, a name given to fishes that give an electric shock when touched with the hand or any electric conductor. One of the best known is the electric eel, a native of South



ELECTRIC EEL

America. It is of nearly equal thickness throughout and grows to the length of six feet. A species of catfish about four feet long that lives in the Nile, and several species of torpedoes, one of which is sometimes found on the eastern coast of the United States, are electric. The



ELECTRIC CATFISH

seat of the four organs that give the shock is along the under side of the tail. After a few discharges, the current is weakened, and an interval of rest is required for a new storage of force.

**Elec'tric Bat'tery**, also called *galvanic battery* and *voltaic battery*, a device for generating electricity by chemical action (See ELECTRICITY,

subhead *Voltaic*). The simplest form of an electric battery consists of a tumbler or cup, partially filled with water, to which about a tablespoonful of sulphuric acid has been added, and in which a strip of zinc and a strip of copper have been so placed that they do not touch each other beneath the surface of the liquid. When the strips of metal are joined at their upper ends, either by placing them together or by connecting them with wire, chemical action occurs between the water and the zinc, and electricity is generated. The wires are called *poles* or *electrodes*, the one attached to the copper being the positive (+) and that attached to the zinc, the negative (—) electrode. See ELECTRICITY, subhead *Positive and Negative*.

There are various patterns of electric batteries, but in all, the cups or cells are the units for small batteries, and tanks are the units for large batteries. The principle upon which the battery acts is that of having two substances, of different electrical potentiality, immersed in the liquid, upon one of which it acts. One of the most common patterns is the cell used for ringing door bells and operating telephones. This consists of a glass cup, containing a solution of sal ammoniac in water, into which is placed a strip of zinc and a plate of carbon. What is known as a *dry* battery is made on a similar plan, but the liquid is mixed with starch and glue into a paste, so that it will not spill if the cup is overturned. See BUNSEN'S BATTERY; DANIELL BATTERY.

**Electric Clock**, a clock driven or controlled by electricity. The common method of regulating clocks by electricity is to attach to each a device, consisting of an electro-magnet attached to a clockwork, which will cause the clock to be wound at frequent intervals, so that the motive power by which it is run will not vary. Some electric clocks are so connected with a central timepiece that the hands are adjusted at frequent intervals to agree with those of the regulating clock; but the most successful plan is to have all the clocks in the system operated from the regulating clock. In such a system there is but one complete clock, and all of the others are simply dials, with such wheelwork attached as is necessary to give the proper motion to the hour and minute hands. See CLOCK.

**Electric Dy'namo**. See DYNAMO.

**Electric Generator**, a form of dynamo-electric machine, used for the production of a powerful electric current. The generator differs

from the ordinary dynamo in being built on to the engine or water wheel which furnishes the power. If an engine is used, a fly wheel with a heavy rim is attached to the machine to insure uniform speed. See DYNAMO.

**Electric Heating**. When an electric current is made to pass through a conductor that offers great resistance, the temperature of the conductor is raised. Electricians have taken advantage of this fact to use electricity for heating, cooking and welding. The wire is imbedded in an enamel which has about the expansive degree of the conductor. The current, meeting resistance, heats the wire. If there were no substance present to convey off this heat the wire would fuse or weld, but the enamel carries off the heat generated, and the current continues to pass along the wire. In practice, the enamel plates, with the wire buried in them, are placed in ovens, on the bottoms of kettles, pans and other kitchen utensils, in broilers, gridirons and on the polishing surface of flatirons. By this means frying, boiling, baking, broiling and stewing are performed by the heat produced by electricity. Welding iron and steel and other metals, susceptible of being united under high temperatures and pressure, is done by pressing together the surfaces to be welded and then passing through them a current of low voltage. In practice, the parts to be welded are clamped together, and more pressure is applied when the metal, at the point of weld, is brought to a welding heat. One particular advantage found in welding by electricity is that the surfaces do not oxidize; consequently, there is no necessity for using a flux.

**Electricity**, *e'lec tris'i ty*, a form of energy. If a warm lamp chimney is rubbed with a piece of silk, or if a stick of sealing wax is rubbed with flannel, it will attract light bodies, such as bits of paper, small pieces of excelsior and sawdust. Numerous other substances, such as hard rubber, resin and gutta-percha, show the same peculiarity. This characteristic of certain substances was discovered in amber, a substance which the Greeks called *electron*, by Thales, a Greek philosopher who lived six hundred years B. C. From this instance, we obtain the word *electricity*.

WHAT ELECTRICITY IS. For centuries electricity was considered a peculiar property, possessed by few substances. It was interesting only on account of the strange effects which it produced, and it is only since about 1840 that it has been turned to practical use. Many theo-



ries concerning electricity have been advocated, only to be abandoned as a fuller knowledge of the subject showed their inability to explain its effects. While scientists do not claim to understand fully what electricity is, they probably know as much about what it is as they do about what heat and light are, and they are now generally agreed that electricity is a form of molecular motion (See MOLECULE; WAVES). This motion is supposed to be different from the motions which produce heat and light, just as its effects are different, but the effects of all these motions are carried in much the same way.

**HOW ELECTRICITY IS PRODUCED.** The experiments with the lamp chimney and the sealing wax, to which attention was directed, show that one way of producing electricity is by friction. There is also another way—by chemical action. On account of these two general sources from which electricity is derived, it was formerly classified under two heads, *static*, or *frictional*, electricity, and *galvanic*, or *voltaic*, electricity. Notwithstanding the fact that a more complete knowledge of the subject has shown that there is no good reason for this division, it is still followed.

**FRICTIONAL OR STATIC ELECTRICITY.** This is the name applied to all electricity produced by friction. When glass, rubber, sealing wax and other substances are rubbed, they become electrified, or charged, and will attract light bodies, such as bits of paper and sawdust. Many similar experiments prove that electrified bodies possess the power of attracting certain other bodies. The electric force accumulates at the ends of the bodies, which for this reason are called poles; therefore, electrified bodies, except spheres, show polarity.

*Positive and Negative Electricity.* If we present the sealing wax to the glass tube, the two objects will attract each other, but two electrified glass tubes or two electrified sticks of sealing wax will repel each other. A pith ball, suspended from a silk thread so that it will be between a glass tube and a stick of sealing wax, both of which are electrified, will vibrate rapidly between them. If we should present the tube and the sealing wax to bits of paper, we should find that these would fly first to one and then to the other. Numerous experiments show that these bodies are differently electrified, and that bodies similarly electrified repel each other, while those oppositely electrified attract each other. The terms positive (+) and negative (—) are used to indicate these

different conditions. The glass when rubbed with silk is positively electrified, while the sealing wax when rubbed with flannel is negatively electrified.

*How Electricity Travels.* Electricity travels through some substances easily, while there are others through which it will not pass at all. Substances of the first class are called *conductors*. All metals, most liquids, animal tissues and the earth are good conductors, silver and copper being the best. Substances of the second class are called *nonconductors*, or *insulators*. Glass, resin, rubber, dry wood, dry air, silk and woolen are illustrations of good insulators. No sharp line can be drawn between conductors and insulators, as there are numerous substances, such as damp air or unbaked wood, through which some electricity will pass. These substances are both poor conductors and poor insulators. Electricity passes through a conductor from molecule to molecule, the same as heat passes from one end of an iron rod to the other.

A body which is a good conductor cannot become electrified unless it is placed upon an insulator, as the electricity passes off as fast as formed. One cannot electrify a brass rod while holding it in the hand, but by suspending it by a silk cord or laying it on a tumbler, so as to insulate it, and rubbing it with silk, it may be electrified.

The electrical condition of a body is called its electrical *potential*, which means the same as electrical pressure. The more highly electrified a body is, the higher its pressure, or potential. When two bodies of unequal potential are connected by a conductor, their potential is equalized by a flow of electricity from the body having the higher to that having the lower. As static electricity tends to escape into the air, the conductor serves a useful purpose by preventing it from so doing, the same as a pipe carrying water keeps the liquid from spreading over the surface along which it flows. This flow of electricity is called a current, but it is a current of force, merely. Positive currents of electricity flow from bodies having a high potential to those having a low potential, while negative currents flow from bodies having a low, to those having a higher, potential.

*Induction.* Bodies become electrified in two ways; by direct contact with the electrifying agent, as in the case of friction, and by being brought into the presence of an electrified body. The second method is known as *induction*. It

is found that all electrified bodies influence the atmosphere surrounding them. If an electrified glass tube be brought near an electroscope, the arms immediately separate; when the tube is withdrawn, the electroscope returns to its former position, showing that it did not receive any charge from the electrified body. A body can be charged by induction, however, by removing the opposite electrification. This is due to the fact that when an electrified body is brought near an object, it induces the opposite kind of electrification on the side next to it and the same kind on the opposite side. The principle of induction is used for charging nearly all electrified bodies, either for laboratory or practical purposes.

*Electricity on the Surface.* In every electrified body, the electric force gathers on the surface only; consequently a hollow body will contain as much as a solid body of the same size. An eggshell covered with tin foil can be as strongly electrified as a solid piece of copper of the same shape and size. Bend a piece of tin or sheet-brass so as to form a cylinder at least three inches in diameter; then attach an electroscope by a wire to the outer surface, suspend another from the inner surface, and place the cylinder on a glass support, like a tumbler. Electrify the outer surface, and the balls of the first electroscope will separate, but those of the second will not be affected. If you electrify the inner surface, the effect will be shown by the electroscope suspended from that surface, while the one attached to the wire will not be affected.

*Electric Discharge.* Whenever the nonconductor between two oppositely electrified bodies breaks down and the current passes through the intervening space, it is called a discharge. The nature of the discharge depends largely upon the shape of the conductor and the nature of the insulating medium. When the conductors present a rounded surface, like two balls, and an insulating medium, such as the open air, offers a good degree of resistance, the discharge is in the form of a spark, which takes a zigzag course, because it follows the line of least resistance. If, instead of two balls, two oppositely electrified points are held near each other, the discharge flows steadily, and in a dark room and with a strong current it appears as a brush of purple light. If the resistance of the air is removed by enclosing these points in a vacuum, the effect is much stronger. Certain toys used with electrical machines are constructed in fantastic designs, and these, when placed in vacuum

tubes, are illuminated by the discharge of the current from the machine. Lightning is an effect produced by a discharge through the lower layers of the atmosphere, and it corresponds to the first effect described; the aurora borealis is caused by a discharge through the upper regions of the atmosphere and corresponds to the second effect. A practical use of this discharge is seen in the arc light (See ELECTRIC LIGHT).

VOLTAIC ELECTRICITY is electricity generated by chemical action. It was so named from Volta, who constructed the first apparatus for its production (See ELECTRIC BATTERY). On account of the constant current maintained by the chemical action in the battery, voltaic electricity is sometimes called *current electricity*. Voltaic electricity is very convenient for many purposes for which static electricity is not suited, on account of the expense of maintaining a constant current by the use of a dynamo electric machine. Some of the most common uses are in ringing doorbells and in operating electric signals, the telegraph and telephone.

The effects of voltaic and static electricity are practically the same, and the great advance made in the application of electricity to the arts has been because of the discovery that static electricity can be used for many purposes for which only voltaic electricity was formerly supposed possible. The effects of electricity may be classed as mechanical action, heat, light and chemical action. For a description of the applications necessary to produce these effects, see DYNAMO; ELECTRIC MACHINE; ELECTRIC LIGHT; ELECTRIC MOTOR; ELECTRIC RAILWAY; ELECTROLYSIS, ROENTGEN RAYS; for the relation of electricity to magnetism, see MAGNETISM; for electrical measurements, see ELECTRIC METER; GALVANOMETER.

**Electricity, USES OF, IN MEDICINE.** When an interrupted electric current passes through the human system, it produces a contraction of the muscles in the parts affected every time the circuit is broken or closed. By the use of an electric machine or a battery with an induction coil, such a current can be used successfully in treating such diseases as paralysis of the muscles, gout and rheumatism. Surgeons also employ electricity for cauterizing wounds and removing diseased tissue. For these purposes the electrodes are joined by fine wire, which are raised to white heat by the passage of the current. Very delicate instruments of this nature are constructed, and they are specially valuable for



## Electric Light

treating diseases of the nose and throat. In most cases the current employed is generated by static machines.

**Electric Light**, light obtained through heating a suitable substance, as carbon, to incandescence, by causing an electric current to pass through it. The principle of the electric light was discovered by Sir Humphry Davy in 1800. He found that when two pieces of charcoal, which are connected with opposite poles of a powerful electric battery, were pressed together, a flame appeared between them. This was the origin of the electric arc light, but the expense of the material consumed in the batteries made a practical application of this method of lighting at that time impossible. An electric light, however, was introduced into the lighthouse of Dungeness, on the southern coast of England, in 1862, and it continued in use for a number of years; but it was not until the invention of the dynamo in 1870 that the electric light became possible for commercial purposes. There are now three systems of lighting in general use, known as the *arc light*, the *incandescent light* and the *vapor light*.

**ARC LIGHT.** The arc light is the oldest and was for a number of years the only kind of electric light in use. It is produced by bringing the points of two sticks of carbon together and connecting them with opposite poles of a powerful electric current. When the current is turned on and the circuit completed, the points of these carbons are separated a short distance and a brilliant flame appears between them. The apparatus for an arc light consists of a frame for holding the carbons, and an electro-magnet, attached to the holder of the upper carbon. As soon as the circuit is completed, the current passes through this magnet, withdraws the positive pole to the proper distance, and maintains it in this position as long as the light is in operation. If an alternating current is used, particles of carbon pass for a part of the time from the lower to the upper carbon and both points maintain their shape and size; but with a direct current the particles pass from the upper (positive) to the lower (negative) carbon, and the positive point becomes hollow at the end, while the negative maintains its shape. Arc lights are very powerful and are used for lighting streets, docks and large public buildings, such as stores, depots and halls. They are usually enclosed in ground glass or porcelain globes, which diffuse the light more evenly and prevent the sharp lights and shadows produced by the light when not protected.

## Electric Light

**INCANDESCENT LIGHT.** The incandescent light, which was introduced by Thomas A. Edison and other inventors is produced by passing a current over a small conductor, which is raised to a white heat. This conductor consists of a thread of carbon and is enclosed in an egg-shaped glass, from which the air has been exhausted. The incandescent lamp possesses several advantages over the arc lamp for lighting interiors. Its light is extremely steady, its temperature is low and the color of the light is more like that of the sun. Incandescent lamps can also be placed in any position desirable, and they do not vitiate the air by their combustion. For these reasons, and also because they are less expensive, incandescent lamps are quite generally used in lighting buildings, and in some instances they are employed for lighting streets, especially where the current has to be brought a long distance.

A new pattern of incandescent lamp, known from its inventor as the Nernst lamp, consists of a small nonconductor, known as the *glower*, which is placed in the top of a globe from which the air has not been exhausted. This lamp gives a particularly soft white light, which is pleasing to the eye and is evenly diffused. A Nernst lamp is also more brilliant than the ordinary incandescent lamp of the same size. These lamps are now in quite extensive use.

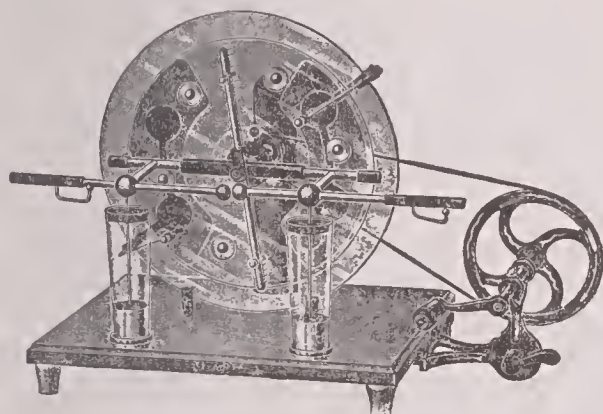
**VAPOR LIGHT.** A still later invention in electric lighting is the vapor lamp, which consists of a long glass tube from which the air has been exhausted, with a metal wire at each end. These wires conduct the current to the electrodes, one of which is mercury. The lamp is started by tilting the tube so that the mercury flows from one electrode to the other in a small stream. This makes connection between the electrodes, and when the stream of mercury breaks an electric arc is formed. The heat from this arc vaporizes the mercury, and this vapor becomes luminous. Since there is no opportunity for the vapor to escape, the mercury is used over and over and the lamp will operate as long as the vacuum remains perfect. The vapor lamp produces a brilliant white light, which radiates evenly in all directions. It is particularly valuable for lighting large areas, such as stores, factories, docks and other places where a strong light is required.

An electric lighting plant consists of the central station, where dynamos, usually operated by steam engines, generate the current; the main lines, which conduct this current to the various parts of the city, and the individual lines, over

## Electric Machine

which the current is taken to supply light where it is needed. Where these individual lines connect with the main lines, the potential of the current is reduced by causing it to pass through transformers. See TRANSFORMER.

**Electric Machine**, any machine for producing powerful electrical effects. The name is, however, seldom applied to machines depending on magneto-electric principles, but is practically confined to two classes of machines—those which act by friction and those which act by electrostatic induction. The former are called *friction machines* and the latter *influence machines*. For many years the former were the only kind known, but they have now been almost superseded by the latter. In friction machines, the electricity is generated by the friction of either a glass cylinder or a circular glass plate against cushions covered with an amalgam of zinc and tin. The positive electricity, which is thus developed on the surface of the glass, is given off to an insulated brass conductor, furnished with teeth



ELECTRIC MACHINE

like those of a comb, the sharp points of which are nearly in contact with the glass. The negative electricity, which is at the same time generated on the cushion, must be provided with some means of escaping, or the action of the machine would soon stop. It is usually allowed to escape to the earth by a brass chain, connected with the cushions; but in some machines a negative conductor, connected with the cushions, is insulated, like the positive conductor, by a glass support. Negative sparks can then be drawn from this conductor at the same time that positive sparks are drawn from the other. Friction machines have been almost entirely replaced by influence machines, and descriptions of these are found in ordinary text-books on physics.

**Electric Meter**, an instrument for measuring and recording the amount of electricity used in electric lighting or by an electric motor. The

## Electric Motor

meter in general use is a sort of electric motor, whose armature revolves in a horizontal direction. The axis of the armature is connected with a system of clockwork, which moves an indicator over dials that are graduated decimally. The speed with which the armature revolves depends upon the quantity of current passing through the meter. The unit of measure is the watt, that is, a current of one ampere, with a pressure of one volt, flowing for one hour. This unit is called a *watt-hour*. Electric meters should be accurate, as upon their reading is determined the compensation which the consumer pays the company furnishing the current. See ELECTRIC LIGHT.

**Electric Mo'tor**, a device for driving machinery by the power of an electric current. The electric motor is constructed on the same plan as the dynamo (See DYNAMO). If a dynamo be supplied with a current of electricity from an outside source, it will run as a motor. The principle of the machine is the inducing of magnetism by an electric current. The current induces magnetism in the armature and the field magnet, and the reversed position of the poles in these magnets causes the armature to revolve. The revolution produces another reversal, and so the motion is continued. As long as the current is constant and the resistance even, the motor revolves at a uniform rate of speed.

While electric motors and dynamos are in principle interchangeable, in practice each machine is constructed for the work it is to perform and could not with advantage be used for the opposite purpose. Dynamos are much larger than motors, and the same dynamo may furnish power for a number of motors, as a dynamo of 100 horse-power may supply power to 20 motors of 5 horse-power each, or 2 motors of 50 horse-power each, and each of these may be located far from the others and from the dynamo.

The great advantage in the use of the electric motor is derived from the ease with which electric power can be carried a long distance and distributed with comparatively little loss. In a large factory the placing of electric motors at frequent intervals does away with the long lines of shafting, with their accompanying belts and pulleys, which are necessary when only one motor, as a steam engine or water wheel, is employed. The electric motor also makes it possible to utilize water power for generating the current, often hundreds of miles from the place where the motors are located. Because of



## Electric Railway

these advantages electric motors are rapidly taking the place of large engines in factories. Many machines are now constructed with an electric motor attached. In such cases all that is necessary to operate the machine is to turn on the current. By the use of such a device, waste of power is eliminated, as the instant the work is completed the power can be shut off. The electric motor does not require a skilled operator, and with necessary attention to oiling and cleaning, it will usually run for years without repair. See **ELECTRIC RAILWAY**.

**Electric Rail'way**, a railway on which electricity is used as the motive power. The idea of operating railways by electricity was proposed by Jean Henry Cazal, a French engineer, in 1864, and at the industrial exposition in Berlin in 1879 a circular railway about one thousand feet long was exhibited. The first electric railway in the United States was constructed by Thomas A. Edison at Menlo Park, N. J., in 1880. The track was about ninety rods in length. Three years later Stephen D. Field of California exhibited an electric locomotive at an exposition of railway appliances in Chicago. The first suburban electric line in the United States was constructed from Baltimore to Hampden, Md., and put in operation September 1, 1885. Three years later the street railways of Richmond, Va., were equipped with electric motors, and from that time to the present the expansion of the electric railway has continued, until it is found in all large cities and in many small cities and towns. Indeed, many electric lines have been constructed between cities and towns distant from one another.

The motor apparatus of an electric railway consists of a central station, where a dynamo operated by steam or water power generates the electric current. This is distributed along the line through overhead wires, which are insulated from surrounding objects. On single track roads but one overhead wire is used, except at the switches, where two are always necessary. From the wire the current is drawn by the *trolley*, a small grooved wheel running on the trolley wire and attached to the end of a conducting pole that extends upward from the car. The trolley is connected with the motors, which are attached to the trucks of the car by wires extending down the side or end of the car. The motor is controlled by a compound switch, or controller, which is operated by the motorman. After it has been used, the current passes into the trucks of the car

## Electro-chemistry

and from these to the rails, which are connected by copper wire at their joints, so that they return the current to the station from which it started. This is the plan in most general use for distributing power; but another, used on elevated roads and to some extent on lines which own their right of way through the country, is known as the *third rail* system. In this a third rail, either between the rails of the track or opposite one of them, supported on insulators, carries the current, which is brought in contact with the motor through a shoe that slides over the rail. The third rail is dangerous and cannot be used in places where there is liability that people or animals will come in contact with it. In 1910 there were over 40,500 miles of electric railways in the United States. Electric locomotives having great power are now in use on the New York, New Haven & Hartford Railroad for hauling both passenger and freight trains. They are also employed for hauling trains through the tunnels through which the New York Central and the Pennsylvania systems enter New York City; by the Grand Trunk in the Saint Clair Tunnel; by the Great Northern in the Cascade Tunnel and by the Baltimore & Ohio in entering Baltimore.

The development of the electric railway since 1900 has been very rapid, not only in the extension of the lines but also in the improvement of motors and cars. Electric lines now maintain a speed nearly equal to that of the best steam railways, and electric sleeping cars and dining cars are provided for travel between distant points. The great advantage of the electric railway lies in the reduction in expense of operating, and also in the fact that lines can be extended where it is either impracticable, because of expense, or impossible, because of grades, to construct railways operated by steam power.

**Electric Weld'ing**. See **WELDING**.

**Elec'tro-chemistry**, *kem'is try*, that branch of chemistry which deals with the changes due to electricity, or with chemical changes that produce electricity. If two platinum rods are placed in a strong solution of common salt and are connected with a battery or other source of electricity, the current passing through the solution decomposes it in such a way that the sodium is set free at the negative electrode (See **ELECTRODE**), but combines immediately with the water, forming common, or caustic, soda. The chlorine is set free at the positive electrode and escapes in bubbles through the liquid. Here electricity causes a chemical change (See

## Electrocution

ELECTROLYSIS). If a zinc rod is placed in a solution of zinc sulphate, and a copper rod is placed in a solution of copper sulphate, and the solutions are then separated only by a porous partition, a current of electricity will flow through the circuit when the rods are connected by wire. Here chemical action produces electricity. This is the principle upon which the development of the electric, or galvanic, battery rests. See ELECTRIC BATTERY.

Electro-chemistry is very generally employed in the arts and in the manufacture of soda and chlorine from salt, potassium chlorate from potassium chloride, carborundum (See CARBORUNDUM) and carborundum aluminum and other substances requiring the action of intense heat. This heat not only smelts the ore containing the required substance, but also causes certain chemical changes to take place, so as to set the product free. The operations of electro-chemistry most commonly seen are those of electroplating and electrotyping. See ELECTROTYPING.

**Elec'trocution**, a method of producing death by an electric current. It is used exclusively in criminal executions in several states of the United States, having been adopted on the recommendation of a board of investigators, for the reason that it is more humane than hanging. See CAPITAL PUNISHMENT.

**Elec'trode**, the term used to denote the terminals by which electricity enters or leaves a body upon which it acts. They are the same as *poles*. The positive electrode is known as the *anode*, and the negative is called the *cathode*. These terms were originally introduced by Faraday and were used only in connection with electrolysis, but they are now in general use wherever electricity is applied.

**E'lectrol'ysis**, the chemical decomposition of certain bodies, under the action of a current of electricity. The following are the main facts to be mentioned. When an *electrolyte* (a body capable of electrolytic decomposition) is subjected to a current of electricity of sufficient intensity, it is broken up into two elements; thus, if two platinum plates connected with the first and last plates of a battery be plunged in a trough containing a solution of chloride of silver, the chlorine is given off at the plate by which positive electricity enters, that is, at the plate which is connected with the copper plate of the battery, and the silver is deposited at the plate connected with the zinc plate of the battery. Three laws are well established, viz.:

## Electro-magnet

1. *The electrolytic action of the current is the same at all parts of the circuit.*

2. *The same quantity of electricity decomposes chemically equivalent quantities of different electrolytes.*

3. *The quantity of the electrolyte decomposed in a given time is proportional to the strength of the current.*

It is known that the electric currents which pass through the ground from trolley lines to power houses—in fact, any other strong currents on the soil—tend to eat away the metal pipes which carry water, gas or sewage. Sometimes the decay is so serious that the pipes break and the gas or water escapes, to do great damage. Trouble that has resulted in suits between water and gas companies and railway companies has arisen in many cities. The remedy is one of prevention and consists in providing suitable lines for carrying return currents of electricity.

**Electro-magnet**, a piece of iron temporarily converted into a magnet by means of a current of electricity sent through a wire coiled round the iron. The wire is usually covered with silk, cotton, gutta-percha or some other insulator, to prevent the current from leaping across and to compel it to travel through the whole length of the wire. The more pure and soft the iron is, the stronger will its magnetism be while it lasts, and the more completely will it disappear when the current stops. Steel is less affected than soft iron for the time, but remains permanently magnetized after the current ceases. The iron which is magnetized by the current passing round it is called the *core*. It is frequently straight, the wire being wound upon it like thread upon a reel; but very frequently it has the shape of a U, or horseshoe, the wire being coiled round the two ends and the bend of the U left uncovered.

To predict which end will be the north pole, the following rule may be employed: Let the core be a straight bar of iron held in front of you pointing left and right; then if the current ascends on the side next you and descends on the further side, the north pole is to your left hand, the south pole to your right. If the straight bar is then bent into horseshoe shape, its poles will not be changed.

An electro-magnet is said to be *made* when the current is sent through its coil, and *unmade* when the current is stopped. In some applications of electro-magnets it is necessary to make and unmake them in rapid succession. It is then preferable for the core to consist of a bundle of iron wires, rather than of a solid bar.



## Electro-magnetic Theory of Light

Electro-magnets are much more powerful than other magnets of the same size. They are used in electric motors. See **ELECTRIC MOTOR**; **ELECTRO-MAGNETISM**.

**Electro-magnetic Theory of Light**, a theory that light is caused by electro-magnetism (See **ELECTRO-MAGNETISM**). The theory holds that light and electricity come from the same source, and the discovery of the Roentgen rays, which have several characteristics of the electric current, tends to confirm the theory, though it is not yet generally accepted by leading scientists.

**Electro-magnetism**, a term that in its broadest sense denotes the science which treats of the relation between magnetism and electricity. In a narrower sense, a magnetic effect produced by electricity is said to be *electro-magnetic*. The simplest experiment to illustrate this action is to take an ordinary surveyor's compass, hold just above it a copper wire parallel to the needle of the compass and then, while the wire is in this position, let its two ends be connected with the two poles of a galvanic battery. The needle will instantly turn away from its north and south position and will remain deflected as long as the current continues to pass over it. If the current flows from south to north, the north end of the needle is turned to the west, and if the current is in the opposite direction, the needle turns to the east. This is the easiest test for determining the direction in which a current is flowing through a wire; and it is the basis of the construction of galvanometers, the instruments chiefly employed for the measurement of currents (See **GALVANOMETER**). The current tends to make the needle take a position at right angles to the direction of the current; but as the earth tends to make the needle point north and south, the position actually taken is between the two. The fact that a current deflects a needle was discovered by Oersted of Copenhagen, in 1819. When a magnet is moved in the neighborhood of a wire or other conductor, the motion causes a current of electricity in the conductor; and a similar effect occurs if the wire is moved while the magnet remains at rest. In the experiment above described, of making a magnetic needle turn on its pivot by sending a current through a wire held above it, the motion of the needle produces for the time being a weakening of the current. If the needle were made by mechanical means to turn the contrary way, it would strengthen the current for the time being. If there were no original current, the turning of

## Electro-motive Force

the needle to either side by mechanical means would produce a current in the wire. The current thus produced is always opposite in direction to that which would aid the motion. The principles of electro-magnetism are employed in the construction of electric motors (See **ELECTRIC MOTOR**).

**Electrometer**, an instrument used to measure the difference of potential between two conductors. Most of the electrometers in actual use are inventions of Sir William Thomson, who was the first to give accuracy to this branch of electrical measurement. His quadrant-electrometer is the instrument chiefly used, and its indications are usually given by means of a small movable mirror which, suspended by a fine thread, reflects a spot of light from a lamp on to a paper scale. When the two conductors which are tested have the same potential, the spot of light stands in the middle of the scale, and its movement to either side indicates the difference of their potentials. The instrument is sufficiently delicate to give a sensible displacement when the two conductors are the two plates of a single galvanic cell; and a displacement twice as great will be obtained by combining two such cells.

**Electro-motive Force**, a phrase, commonly abbreviated into the three initial letters *e. m. f.*, which is of very frequent use in modern electrical literature, especially in connection with electric currents. The electro-motive force in a wire through which a current is flowing may be compared to the difference of pressures in a long, narrow horizontal pipe, through which water is flowing. As the difference of the pressure at the two ends of the pipe forces the water through, in spite of frictional resistance, so the difference of the potentials at the two ends of the wire forces the current through, in spite of the electrical resistance of the wire. This difference of potentials is another name for electro-motive force. The commercial unit of electro-motive force is the *volt*. Its magnitude may be inferred from the statement that the electro-motive force of a single cell of an electric battery is usually more than one volt and less than two and one-half volts. The highest electro-motive force usually permitted in wires which are liable to be touched by the public is about 200 volts. It is no unusual thing for a dynamo to give an electro-motive force of 1000 or 2000 volts. Currents produced by a source of high electro-motive force are often called *currents of high tension*. They are found to be necessary when several

arc lamps are to be supplied in series, and they are also necessary on the score of economy when power is desired to be transmitted by electricity to great distances. See **ELECTRICITY**, subhead *Voltaic Electricity*.

**Electrophorus**, *el'ek trof'or us*, a simple machine for generating static electricity. It consists of a glass plate, fastened to a board, and a metallic disk, either of brass or tin, to which is attached a handle of glass or hard rubber. To

generate electricity by this machine, rub the glass with silk, then place the metallic plate upon it and touch the upper surface of



ELECTROPHORUS

this plate with the finger. On lifting the metallic plate by the handle, it will be found to be negatively electrified and may be discharged by a spark. The glass becomes positively electrified when rubbed with the silk, and when the metallic disk is placed upon it, it is electrified by induction. See **ELECTRICITY**, subhead *Induction*.

**Elec'troscope**, an instrument for showing that a body is electrified. When a strip of gold leaf, folded in the middle, is suspended in a bottle or a jar by a wire that can be connected with the electrified body, an electroscope is formed. A more simple electroscope, but one not so sensitive, is made by tying two pith balls, about the size of a pea, to the opposite ends of a cotton or linen thread. When an electrified body approaches one of these sensitive instruments, its presence is indicated by a separation of the strips of gold leaf or of the pith balls, as the case may be.

**Elec'troty'ping**, the process of making a metallic cast of type or an engraving by electricity. The form of type or woodcut is cleansed and dusted with finely powdered graphite. It is then laid face upward on a powerful press, a sheet of beeswax upon a lead plate is placed on top of the form and an impression is taken in the press. The wax mold so formed is coated with powdered graphite to make it a conductor of electricity. After the loose particles of lead are blown off, the wax mold is washed with a weak solution of sulphate of copper; then it is dusted with iron filings. It is then suspended in a bath consisting of two parts of sulphate of copper and one part of sulphuric acid diluted

somewhat in water. The wax plate is then connected with the negative pole of a battery, and a sheet of copper is hung in front of the wax and connected with the positive pole. The current is then turned on, and the copper is drawn from the plate and deposited upon the wax mold. After several hours the mold is removed from the bath, and the shell of copper is taken from the wax. It is then *backed up* with lead or type metal and planed smooth, when cold; the edges are then finished and the plate is ready for the press. The plate, when complete, is about one-eighth of an inch thick. It is then placed on a block or a frame to make it the same height as the type. Electrotypes are used in book and magazine printing and in the reproduction of engravings and halftones. See **HALFTONE**; **PRINTING**.

**Elegy**, *el'e j'y*, in its widest sense, a serious poem with a melancholy tone; more narrowly, a funeral song. The following list includes most of those which are considered of highest rank, although there are many beautiful elegies which might be added: Gray's *Elegy Written in a Country Churchyard*; Shelley's *Adonais* (lament for Keats); Wordsworth's *Bereavement*; Matthew Arnold's *Thyrsis*; Lowell's *Threnodia*; Tennyson's *In Memoriam*; Spenser's *Lament for Astrophel*; Milton's *Lycidas*.

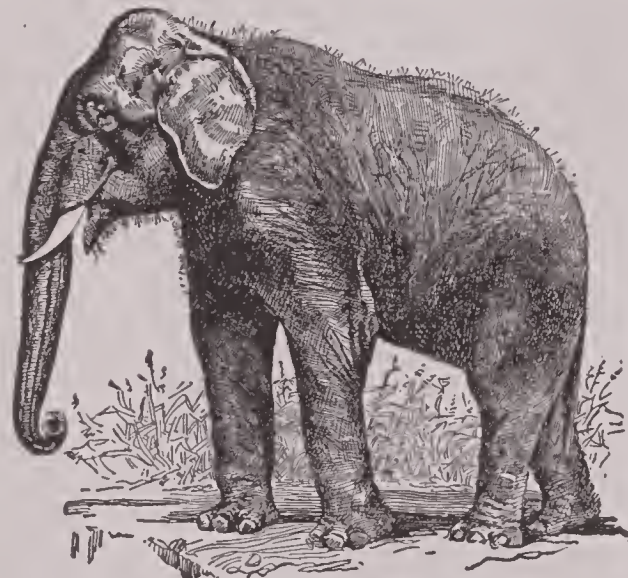
**El'ements**, the simplest parts of which anything is composed; the ultimate indecomposable constituents of any kind of matter. In ancient philosophies the term was applied to fire, air, earth and water. In chemistry the name refers to those substances whose molecules contain but one kind of matter (See **ATOMIC THEORY**). The medieval chemists, absorbed in the study of metals and mineral substances, supposed that the metals consisted of an elemental sulphur and an elemental mercury, mixed together more or less perfectly and in different proportions. To these were subsequently added salt and some others, so that about the middle of the seventeenth century the first principles amounted to five, divided into two classes; the active, consisting of mercury or spirit, sulphur or oil, and salt; and the passive, consisting of water or phlegm, and earth. The names remained, not so much as denoting substances or ultimate principles as gradually coming to denote functions. Later studies brought again the idea of elementary substances; and the list of those considered as simple naturally changed with the change of theory introduced by Lavoisier, who considered the elements to be oxygen, nitrogen,



## Elephant

hydrogen, sulphur, phosphorus and carbon, the metals and the earths. Boyle had already practically defined an element as a body not yet decomposed, the definition now commonly adopted. In 1910 eighty-one elements were known, a few of which are so recently discovered and so rare and costly that their properties have not yet been thoroughly studied. The most important elements are aluminum, antimony, arsenic, barium, bismuth, boron, bromine, cadmium, calcium, carbon, cerium, chlorine, chromium, cobalt, copper, gold, hydrogen, iodine, iridium, iron, lead, lithium, magnesium, manganese, mercury, nickel, nitrogen, oxygen, phosphorus, platinum, potassium, silicon, silver, sodium, strontium, sulphur, tin and zinc. On each of these there is an article in these volumes.

**Elephant**, *el' e fant*, the largest living land animal, usually regarded as being of two distinct species. The African elephant is taller, has



ASIATIC ELEPHANT

larger ears and less elevated head than its Asiatic brother. The Asiatic elephant, however, is more familiar than the African, being the only one which seems to be gentle in captivity. Sometimes elephants attain the height of fifteen feet, but usually a mature animal is nine or ten feet high and weighs from 4000 to 10,000 pounds. The body is very bulky, the legs are enormously large and almost straight and the short toes are covered by hoof-like nails. The skin of the elephant is very thick and coarse, and it bears only here and there a few scattered hairs. The most remarkable feature of the elephant is its long trunk, an extension of the nose through which the nostrils run to the very tip. This tip is exceedingly sensitive, and in one

## Elephant

species it is furnished with two small projections; one, which somewhat resembles a finger, extends from the upper surface, and a shorter one projects from the lower part of the tip. The slender trunk can be turned and twisted in all directions, and by means of the sensitive tip the animal can pick up very small objects. The trunk is provided with very strong muscles and is altogether a useful organ in procuring food and is a powerful weapon of defense. With his trunk the elephant picks up and puts into his mouth all his food; he fills his trunk full of water, which he pours into his mouth, and with his trunk he makes a loud trumpeting noise, which is his signal of alarm or anger. On each side of the mouth is a long, rounded ivory tusk, which in well-grown males sometimes weighs as much as 200 pounds. Although the head of the elephant is enormously large, and its forehead broad, yet its brain is remarkably small. However, this does not show any lack of intelligence, for no animal, with the possible exception of the horse and dog, can be taught to do more things with seeming intelligence than the elephant.

Elephants live in herds of considerable size, but the old males sometimes leave the herds or are driven from them, and thereafter live solitary lives. They usually become vicious and exceedingly destructive to everything that comes in their way, including the plantations of the natives. Such elephants are commonly called rogues. The wild animals are caught in various ways. Sometimes pits are dug, into which the animals fall, and at other times a strong enclosure is built, into which the elephants are driven by fires or by men armed with guns or other noise-making instruments. In some localities trained elephants are kept and are sent out into the forests to make the acquaintance of wild ones and to lead them into captivity. Two tame elephants will select a single wild one and keep it so interested that the hunters can come up and put heavy chains about its legs. The animal is then tied to trees and held during the furious anger which follows its capture. After a long and tedious struggle, the elephant is subdued and then becomes tame and submissive.

Elephants have been known since the earliest times, and as far back as we have records in history they were trained by man to do various things and were frequently of great service in times of war. Hannibal had with him an army of elephants when he invaded Italy, and much of his success was due to the terror they inspired.

## Elephanta

The animals have been used to a greater extent in India than in any other country. There they are used as animals of burden, great square saddles being fixed upon their backs. On occasions of pomp or display, the rich princes of India, themselves richly dressed, ride in elegant saddles, which look like handsome canopied chairs. Two or more people may occupy this saddle, and there is also a driver, who sits on the animal's neck. The chief value of the elephant, however, is in moving and transporting heavy loads. They are taught to do this with great skill; for instance, they are taught to handle lumber almost entirely by themselves. They will pick up great timbers, balance them carefully across their tusks, carry them as far as need be and lay them down in regular piles, after they have once been shown what to do.

Many elephants are held in captivity in the United States, altogether for show purposes. There is hardly a zoölogical garden in existence that does not have one or more of these animals. They are always great favorites with the children and learn to expect food and little attentions from every child that comes their way. Some of the herds that are exhibited by circuses and traveling shows are trained to do remarkable tricks.

**Elephanta**, *el'e fan'ta*, a small island in the Bay of Bombay. It is celebrated for its rock temples, or caves, the chief of which is 130 feet long, 123 broad and 18 high, supported by pillars cut out of the rock, and containing a colossal figure of the trimurti, or Hindu trinity, Brahma, Vishnu and Siva. This temple is still used at certain Hindu festivals.

**Elephant Fish**, a fish so named from a proboscis-like structure on the nose. It is called, also, *southern chimaera*. It inhabits the southern Pacific and the waters around the Cape of Good Hope and its flesh is palatable food.

**El'ephanti'asis**, a disease prevalent in the East Indies and other warm countries. One attack of the disease is followed by others, and after each attack some part of the body, usually the leg, becomes larger and larger, till it grows to enormous size. See MOSQUITO.

**Elephantine**, *el'e fan ti'ne*, a small island of Egypt, in the Nile, opposite Assuan, the ancient Syene. It is covered with ruins piled upon one another, the most important being a gateway of the time of Alexander, a small temple, dedicated to Khnum and founded by Amenophis III, and the ancient Nilometer, mentioned by Strabo.

## Elevated Railway

**Elephant Seal**, the largest of the seal family. There are probably two species, one found only on the coast of California and western Mexico, the other in Patagonia, Heard's Island and some parts of the Southern seas. They vary in length from twelve to thirty feet and are about twelve feet in circumference. The nose is prolonged into a proboscis, which fact gives the seal its name. This seal also has heavy tusks and prominent eyes and eyebrows. Both species are becoming rare from their continual slaughter. See SEAL.

**Elephant's Foot**, the name given to a plant because of the shape of its rootstock, which forms a nearly hemispherical mass, rising a little above the ground and covered with a thick, corky bark. It has a slender, climbing stem, which grows to a length of thirty or forty feet, with small, heart-shaped leaves and greenish-yellow flowers. In Africa it is sometimes known as *Hottentot bread*.

**Eleusinian**, *el'u sin'e an*, **Mysteries**, the sacred rites anciently observed in Greece at the annual festival of Demeter, or Ceres, so named from their original seat, Eleusis. These mysteries consisted in a kind of miracle play, which represented the scenes Demeter passed through in searching for her daughter Persephone, and were given before the initiated. The ceremonies for the candidates consisted in walking from Athens to the sea for purification in the salt water; in a day of fasting and offering of sacrifices; in processions, and in going, on the ninth day, from darkness to the lighted shrine of the temple, where the candidates saw that which they were under oath not to reveal. Even slaves might be initiated. As a preparation for the greater mysteries celebrated at Athens and Eleusis, lesser Eleusinia were celebrated at Agræ on the Ilissus.

**Elevated Railway**, a railway built upon a framework above the level of the street. In the United States this framework is of steel, supported by steel pillars. Between these are stretched cross beams, upon which plate girders are laid (See BRIDGE, *subhead Truss Bridges*). The entire structure is thoroughly braced. Ties are laid on the top of the girders, and to these the rails are spiked. The stations are erected on elevated platforms, of the same height as the track, and are reached by stairways or elevators. The first elevated railway was built in New York City in 1867. In 1872 the line was extended, and now New York, Brooklyn, Chicago and Boston, in the United States, and Berlin,



## Elevator

Paris and Liverpool, in Europe, have elevated railways. At first steam was used for the motive power, but that has now been almost entirely replaced by electricity. On a few of the German elevated railroads the cars are suspended beneath the girders. These lines are known as *suspended railways*.

**Elevator**, a mechanical contrivance for hoisting loads from one level to another. That used for carrying grain or coal out of ships, or for similar purposes, consists of a series of boxes, or buckets, attached to a belt traveling round two drums, one above and one below. The elevator used for raising goods from one story of a building to another consists of a movable cage or platform, operated by water, steam or electric power. A *grain elevator* is a large building for storing grain. See GRAIN ELEVATOR.

**El'gar**, EDWARD WILLIAM, Sir (1857- ), an English musician, born at Broadheath, near Worcester. He received a good musical education, studying on both the violin and organ. In 1882 he became conductor of the Worcester Instrumental Society and three years later, organist at Saint George's Church. He resigned in 1889 and soon began to devote himself to composition. Many of his works are widely known and are considered among the most finished productions of modern English musicians.

**Elgin**, *el'jin*, ILL., a prominent city of Kane co., 37 mi. n. w. of Chicago, on the Fox River and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads, and the Chicago, Elgin and Aurora electric line. It is in an agricultural and dairying region. The manufactures include watches, silverplate, condensed milk, shoes, flour and machinery. The educational institutions are the Elgin Academy, a Roman Catholic Seminary, a college of music and a manual training school, and the city also contains the Northern Illinois Hospital for the Insane and Gail Borden Public Library. Elgin was settled in 1835 and was chartered as a city in 1854. Population in 1910, 25,976.

**E'li**, one of the Hebrew judges, the predecessor of Samuel. He was high priest and judge for forty years. The news that his two sons had been slain and the ark taken in battle by the Philistines proved so severe a shock that he fell from his seat and died, at the age of ninety-eight. (*I Sam. I-III.*)

**Eli'jah**, the most distinguished of the prophets of Israel, flourished in the ninth century B. C., during the reigns of Ahab and

## Eliot

Ahaziah (*I Kings*, XVII-XXI). His special work seemed to be to pronounce vengeance on the kings of Israel for their apostasy. Elijah ascended to heaven in a chariot of fire, in the presence of Elisha, his successor.

**Eliot**, CHARLES WILLIAM (1834- ), an American educator, born in Boston. He was educated at Harvard, and upon graduation he was appointed tutor of mathematics in the institution; later he became assistant in mathematics



CHARLES W. ELIOT

and chemistry. After spending seven years at Harvard, he went abroad to study the educational systems and methods of European countries, and on his return he was appointed professor of analytical chemistry in the Massachusetts Institute of Technology. In 1869 he was chosen president of Harvard University. Under his administration the work of the university was completely reorganized and its scope was greatly broadened. Doctor Eliot is recognized as the leading authority on higher education in the United States, and he is widely known as a speaker and writer on educational subjects. He retired in 1909. He is the author of the *Compendious Manual of Qualitative Chemical Analysis*, *The Working of the American Democracy*, *American Contributions to Civilization and Other Essays*, *University Administration* and of many essays and addresses. See HARVARD UNIVERSITY.



## Eliot

**Eliot, GEORGE** (1819–1880), the pen name of Mary Ann, or, as she preferred to write the name in later years, Marian, Evans, one of the greatest of English novelists. She was the daughter of a Warwickshire land agent and surveyor and was born at Arbury. She received at Coventry an excellent education and, although obliged by her mother's death to take charge of the home at



GEORGE ELIOT

sixteen, she managed to keep up her studies, so that by the age of twenty-one she had a large, if decidedly unsystematic, fund of knowledge. The removal of her family to Coventry in 1840 led to her acquaintance with a number of free-thinkers, under whose influence she became an agnostic. Her first literary work was a translation of Strauss's *Life of Christ*, published in 1846.

In 1849, on the death of her father, she went to the Continent and spent some months at Geneva. On her return to England she became assistant editor of the *Westminster Review*, a position which was of great importance to her, because it led to her acquaintance with many of the foremost men of the day. Among her new friends the one who was destined to have most influence on her life was George Henry Lewes. They could not marry, as Lewes had a wife still living, from whom he could not secure a divorce; but they both regarded their union, which lasted until the death of Lewes, as possessed of all the force of a legal marriage. It was through the

## Eliot

influence of Lewes that George Eliot made her first attempt at fiction, *The Sad Fortunes of the Reverend Amos Barton*, which appeared in *Blackwood's Magazine* in 1857. This was followed by *Mr. Gilfil's Love Story* and *Janet's Repentance*, and these were afterwards republished as *Scenes of Clerical Life*. The stories were enthusiastically received, and the praise of the unknown writer was increased on the publication of *Adam Bede*. *The Mill on the Floss*, with its portrayal, in Maggie Tulliver, of George Eliot's own youthful personality, and *Silas Marner* followed, and then she turned from her pictures of middle class English farm life to prepare for the writing of a historical novel, the scene of which should be laid in Italy. The result was *Romola*, her most ambitious, if not in all ways her most successful, work. In her remaining novels, *Felix Holt*, *Middlemarch* and *Daniel Deronda*, her scenes are again laid in England. A lengthy poem, *The Spanish Gypsy*, added little to the fame of its author. Mr. Lewes died in 1878, and George Eliot, although her grief was extreme, was married in 1880 to John Walter Cross. She lived only six months after her marriage.

**Eliot, JOHN** (1604–1690), "the apostle to the indians," was born in England and graduated at Cambridge University. In 1631 he removed to Boston and the following year connected himself with a church at Roxbury, Mass., which connection was not severed until a short time before his death. He learned the language of the indians and devoted himself to improving their condition. He translated the Bible into the indian tongue, published an indian grammar and with others made the *Bay Psalm Book*, an English metrical version of the Psalms, the first book printed in New England. At South Natick and at Newton are monuments to Eliot's memory.

**Eliot, JOHN, Sir** (1592–1632), an English statesman and patriot. He entered Parliament in 1614 and served later in the first three Parliaments of Charles I. He took part with Pym and Hampden in their opposition to the arbitrary measures of Charles and was a firm supporter of Parliament in its refusal to supply Charles with money until reforms had been instituted. He was several times imprisoned for his outspoken patriotism, but each imprisonment only made him more popular. At length he was confined to the Tower for his refusal to submit to royal authority, and when he was brought to trial he was sentenced to imprisonment during the king's pleasure. As even then he refused to



## Elisha

make submission, his petitions for release were refused, and he finally died in prison.

**Eli'sha**, a Hebrew prophet, the disciple and successor of Elijah (*II Kings*, II, IX, XIII, XXI). Many miracles of prediction and cure, and even of raising the dead, are ascribed to him, but his figure is less original and heroic than that of his master. He held the office of prophet for fully sixty-five years, from the reign of Ahab to that of Joash.

**Elix'ir**, a word of Arabic origin, applied by the alchemists to a number of solutions employed in trying to change base metals into gold; also, a potion, the *elixir vitae*, or elixir of life, supposed to confer immortality. Elixir is still used as a name for various popular remedies, which are composed of spicy and stimulating substances, dissolved in alcohol.

**Eliz'abeth**, (1533-1603), queen of England, daughter of Henry VIII and of Anne Boleyn,



QUEEN ELIZABETH

was born at Greenwich and was almost immediately declared heiress to the crown. After her mother had been beheaded (1536), Elizabeth was declared illegitimate, but she was finally placed after Edward and Mary in the order of succession. At the death of Edward, Elizabeth vigorously supported the title of Mary against the pretensions of Lady Jane Grey, but continued throughout Mary's reign an object of suspicion.

## Elizabeth

In self-defense she made every demonstration of zealous adherence to the Roman Catholic faith, but her inclinations were well known. In 1558 Mary's reign came to a close, and Elizabeth was immediately recognized queen by Parliament. The first great object of her reign was the settlement of religion, to effect which a Parliament was called on January 25 and dissolved on May 8, with its object accomplished. The nation was prepared for a return to the reformed faith, and the Parliament was at the bidding of the court. The ecclesiastical system devised in her father's reign was reestablished, the royal supremacy was asserted and the revised prayer book was enforced by the Act of Uniformity. Elizabeth's first Parliament approached her on a subject which, next to religion, was the chief trouble of her reign—the succession to the crown. They requested her to marry, but she declared her intention to live and die a virgin.

For the most part Elizabeth and her ministers were on the side of peace, and they undertook no wars which were not absolutely necessary. Some support was given to the Huguenot party in France and to the Protestants in the Netherlands, so that throughout Europe Elizabeth was looked on as the head of the Protestant party. But her parsimony was too great ever to allow her to furnish substantial aid. Many of the political events of the reign were connected with Mary Queen of Scots (See MARY STUART). The detention of Mary in England, whither she fled to the protection of Elizabeth, led to a series of conspiracies, beginning with that under the earls of Northumberland and Westmoreland and ending with the plot of Babington, which finally determined Elizabeth to make away with her captive. The state of France, consequent on the accession of Henry IV, who was assisted by Elizabeth, obviated any danger from the indignation which the deed had caused in that country; and the awe in which King James stood of Elizabeth, and his dread of interfering with his own right of succession to England, made him powerless. But Philip II of Spain was not to be so appeased, the execution of Mary lending edge to other grievances. Accordingly, he refused to be satisfied with the sacrifice Elizabeth seemed prepared to make of her Dutch allies and dispatched against England the great Armada. Its fate, however, but brought added glory to the queen and her ministry.

The splendor of Elizabeth's government at home and abroad was sustained by such men as Burleigh, Bacon and Walsingham, and it was in



## Elizabeth

her choice of advisers that Elizabeth most clearly showed her wisdom. In her choice of personal favorites she was often less fortunate, as the names of Dudley, earl of Leicester, and the earl of Essex will show. It seems as though not only Elizabeth's chosen advisers, but men of all ranks, worked unconsciously to make her reign great and glorious. In the founding of the East India Company are found the beginnings of England's colonial empire, and such men as Drake and Frobisher carried the English flag to all parts of the world. Even in literature the names of Spenser, Shakespeare and Bacon have made it one of the most famous periods of all time.

**Elizabeth, N. J.**, a town and the county-seat of Union co., on Staten Island Sound, 4 mi. s. e. of Newark and 12 mi. s. w. of New York City, on the New Jersey Central, the Pennsylvania and the Lehigh Valley railroads. The industries comprise the manufacture of sewing machines, paints, hardware and tools, besides iron founding and shipbuilding. The city takes a leading place in the shipment of coal and iron. It is the site of one of the battles of the Revolutionary War and was the point of exchange of prisoners during that period. The town was first settled in 1609 by Dutch and English in the employ of the East India Company, and it became a city in 1855. Population in 1910, 73,409.

**Eliz'abethan Architecture**, a style of architecture which prevailed in England during the reigns of Elizabeth and James I. It succeeded the Tudor style, from which it was derived, and with which it is sometimes confused. The ornaments of this style were heavy and gorgeous, rather than graceful and elegant. The pointed arch disappeared, open-work balustrades replaced the heavy Tudor battlements and a peculiar style of carving in flat relief patterns was used in all features. See ARCHITECTURE.

**Elizabeth City, N. C.**, the county-seat of Pasquotank co., 46 mi. s. of Norfolk, Va., on the Pasquotank River and on the Norfolk &

## Elk

Southern and other railroads. It is in an agricultural, lumbering and cotton region, has a good harbor and a considerable trade. Oyster cultivation is the principal occupation, and there are also shipyards, cotton, flour and planing mills and other industries. The city is a port of entry, and a state normal school is located here. The place was settled in 1793. Population in 1910, 8412.

**Elk**, a name commonly applied in America to a large deer of the Western states (See WAPITI). The name really belongs to the largest deer of Europe, which is very similar to the moose of the United States. It stands about six feet in height at the shoulders, has a



AMERICAN ELK

thick, large, clumsy head and broad, flat horns. It is grayish-brown in color, some parts being lighter than others. The true elk is still found in many of the wilder parts of Europe, as it is rigidly protected by law. Large numbers of elk remain in western Siberia. It is easily tamed and has been used as a beast of burden in Sweden.

The Irish elk was a large animal which is now extinct. It was distinguished by its enormous antlers, the tips of which were sometimes as much as eleven feet apart. Its remains are found not only in Ireland but in Scotland and England and on the Continent.



## Elkhart

**Elk'hart**, IND., a city in Elkhart co., 100 mi. e. of Chicago, at the junction of the Saint Joseph and the Elkhart rivers, and on the Lake Shore & Michigan Southern and other railroads. The rivers furnish water power, and the city contains railroad shops, brass and iron works and manufactures of carriages, bicycles, printing presses, musical instruments, starch and paper. It has a public-school library, a Carnegie library, a high school, a business college and Elkhart Institute. Population in 1910, 19,282.

**Elk'ins**, STEPHEN BENTON (1841-1911), an American politician, born in Perry co., Ohio. He went to Missouri in his youth, graduated at the University of Missouri and was admitted to the bar. Later, in New Mexico, he gained extensive business interests and became delegate to Congress. He removed to West Virginia and became interested in coal mines and railroads. He was appointed secretary of war in 1891 and was Republican Senator from West Virginia from 1895 till his death.

**Elks**, BENEVOLENT AND PROTECTIVE ORDER OF, a benevolent and fraternal order, organized in New York City in 1868. Its purposes are chiefly social and philanthropical. The grand lodge of the order has power to create subordinate lodges, and these in 1912 numbered 1287, with a membership in the United States of 384,742. To date the order has dispersed about \$4,000,000 in benefits. The membership in the order is limited to white male citizens of the United States over twenty-one years of age. The official organ is the *Elks' Antler*.

**Ellesmere**, *elz'meer*, **Land**, the name given to a part of Arctic America. It is separated from Greenland by Smith Sound and is south of Arthur and Grinnell Lands. Snow and ice cover almost the entire tract.

**Elliott**, JESSE DUNCAN (1782-1845), an American naval officer, born in Maryland and educated at Carlisle, Pa. He entered the navy as midshipman in 1804 and distinguished himself in the War of 1812 by winning the first important naval battle on the Great Lakes, during which he captured two British vessels. At the Battle of Lake Erie he was second in command to Commodore Perry. His conduct in this battle, however, was severely criticised and has been the subject of heated controversy. He served under Decatur in the war against Algiers in 1815 and subsequently had other minor commands of squadrons and naval stations.

**Ellipse'**, a figure in geometry ranking next in importance to the circle, produced when any

## Elm

cone is cut by a plane, which passes through it not parallel to nor cutting the base. It may also be defined as the path of a point moving in a plane in such a way that the sum of its distances from two fixed points, called the *foci* (each, a *focus*), is equal to a given line, which will be the length of the ellipse. The area of an ellipse is  $\pi ab$ , in which  $a$  is half its length,  $b$ , half its width, and  $\pi$ , about 3.14159. Kepler discovered that the paths described by the planets in their revolutions round the sun are ellipses, the sun being placed in one of the foci.

**Ells'worth**, EPHRAIM ELMER (1837-1861), an American soldier. At the outbreak of the Civil War he was commissioned colonel of a company of zouaves, which he had organized and which enlisted on the Union side. He tore down a Confederate flag from the roof of a hotel at Alexandria, Va., and while descending from the roof was shot dead by the proprietor, Jackson, who was immediately killed by a soldier. Ellsworth was accounted in the North the first martyr to the Union cause.

**Ellsworth**, OLIVER (1745-1807), an American statesman, born in Connecticut. He distinguished himself in state affairs and in the Continental Congress and was an influential member of the convention which drafted the Constitution of the United States. In 1789 he was elected United States senator from Connecticut and was chairman of the committee which organized the Federal judicial system. He was chief justice of the Supreme Court (1796-1799) and later served the nation and his native state in various high offices.

**Ell'wood**, THOMAS (1639-1714), an early writer among the Quakers. About 1660 he was induced to join the Society of Friends, and he suffered much persecution for his religion. As reader to Milton, whose intimate friend he was, he is said to have suggested to him the idea of writing *Paradise Regained*. In 1705 and 1709 he published the two parts of his *Sacred History*. His works include a poetical life of King David, the *Dauids*.

**Elm**, a widely distributed genus of trees, found in both Europe and North America. No more graceful and beautiful tree exists than the American elm, which grows sometimes thirty feet in height before it branches and then separates into great divisions, with re-curving limbs. The tree grows with great rapidity and hence is a valuable shade tree for parks and city streets. In Boston Common are over a thousand fine elms. In Cambridge, Mass., in 1913, was

## Elmira

still standing the "Washington elm," under which General Washington took command of the Continental Army on the morning of July 3, 1775. An American tree, smaller than the white elm, is known as *slippery elm*, because its inner



bark contains a mucilaginous substance that is used in medicine to soothe irritated surfaces. Elm wood is valuable for making hubs of wheels, cattle yokes and for other purposes. The annual cut in the United States is worth over \$6,000,000. It is thus not one of the most valuable trees.

**Elmi'ra**, N. Y., county-seat of Chemung co., 100 mi. s. e. of Rochester, on the Chemung River and on the Erie, the Lackawanna, the Pennsylvania and the Lehigh Valley railroads. The city is noted for its manufacturing establishments, chief of which are railroad shops, steel plate works, rolling mills, iron and steel bridge works, knitting mills, boot and shoe factories, table factories, glass works, engine and boiler works and tobacco factories. Elmira is the seat of Elmira College, Elmira Free Academy, the New York State Reformatory (See PRISON), the Steele Memorial Library and Arnot-Ogden Memorial Hospital. It has also a state armory, a United States government building, several charitable institutions and a number of fine parks. An interesting feature is a monument to Elmira's noted clergyman and author, Thomas K. Beecher. Near the city is a monument to General Sullivan, commemorating his victory over a force of indians and Tories in the Battle of Newtown at that spot in 1779. Elmira was settled in 1788. It became the county-seat in 1836 and was chartered as a city in 1864. In 1861 it became the state military rendezvous, and during the Civil War it was

## Elyria

the seat of one of the Northern prisons. Population in 1910, 37,176.

**Elmira Reformatory.** See PRISON.

**El'mo's Fire**, SAINT, a meteoric appearance, often seen playing about the masts and rigging of ships. If two flames are visible (Castor and Pollux), the sailors consider it a good omen; if only one (Helena), they regard it as a bad omen.

**El Paso**, *el pah'so*, TEXAS, the county-seat of El Paso co., on the Rio Grande, 300 mi. w. of Dallas, being a terminus of the Texas Pacific, the Atchison, Topeka & Santa Fé, the Mexican Central railroads and an important point on the Southern Pacific. The city is in a cattle country and carries on a large trade. There are smelting works, cigar factories and other industries. Saint Joseph's Academy, a Congregational training school, a theological seminary and a school of mines are located here. The town was first settled in 1827 and became a city in 1869. It was long an unimportant village, but has developed rapidly since 1880. Population in 1910, 39,279.

**El'wood**, IND., a city in Madison co., 45 mi. n. e. of Indianapolis, on the Lake Erie & Western and the Pittsburg, Cincinnati, Chicago & Saint Louis railroads. It is in an agricultural district and exports considerable live stock, grain and farm produce. Natural gas is found in the vicinity, and the city contains flour mills, brickyards, iron works, wood-working establishments and extensive glass factories. Population in 1910, 11,028.

**E'ly**, RICHARD THEODORE (1854- ), an American political economist, born at Ripley, N. Y. He was educated at Columbia College and in the University of Heidelberg, Germany. From 1885 to 1892 he was professor of political economy at Johns Hopkins University, and in the latter year he was made director of the school of economics and political science at the University of Wisconsin. His writings, though not purely socialistic in tone, disclose views which stamp him as a radical and progressive social reformer. Among his more important works are *French and German Socialism*; *Recent American Socialism*; *The Labor Movement in America*; *Cooperation in America*; *Problems of To-day*; *Socialism and Social Reform* and *Outlines of Economics*.

**Elyr'ia**, OHIO, the county-seat of Lorain co., 7 mi. s. of Lake Erie, on the Black River and on the Lake Shore & Michigan Southern and the Baltimore & Ohio railroads. The city



## Elysium

is in an agricultural region, and sandstone is extensively quarried. There are also manufactures of bicycle and automobile supplies, saddlery, iron and steel products. Population in 1910, 14,825.

**Elysium**, *e lizh'e um*, or **Elysian Fields**, among the Greeks and Romans, the regions inhabited by the good after death. By Homer, Elysium is considered as identical with the Isles of the Blessed—a place to which the gods carry their favorites while still alive; while by Vergil and the later poets it is represented as that part of the lower world where the souls of the good dwell.

**El'zevir**, a famous family of Dutch printers, who were prominent during the sixteenth, seventeenth and early eighteenth centuries. They printed editions of the classics and of French, German and Italian writers, and their works were distinguished for the elegance of their style. *Elzevir editions* of various works, still on the market, take their name from this family.

**Eman'cipa'tion Proc'lama'tion**, a state paper issued by President Lincoln, Jan. 1, 1863, by which all slaves in the states or parts of states actually engaged in rebellion and unrepresented in Congress, or not in possession of the Union armies, were freed. It was justified as a "fit and necessary war measure" and had been contemplated by Lincoln for many months. On Sept. 22, 1862, after the victory at Antietam, he had made a preliminary announcement of his intention. The proclamation aroused intense interest and was denounced by many as an unwarranted, unconstitutional and tyrannical act.

**Embalming**, *em balm'ing*, the process of filling and surrounding bodies, particularly corpses, with aromatic and antiseptic substances in order to preserve them from corruption. The ancient Egyptians employed the art on a great scale and regarded it as a religious function. Other nations which practiced embalming, the Assyrians and Persians for example, seem never to have carried it to the point of perfection which the Egyptians attained (See MUMMY). In later times bodies have been preserved a long time by embalming, especially when they have remained at a low and uniform temperature and have been protected from the air. Of the various modern artificial means of preserving bodies, injections of a mixture of mercuric chloride, arsenic and zinc chloride into the blood vessels and cavities seems to be most effective. In most cases, of course, the object

## Embroidery

is the preservation of the body for a short time only. Embalming is very generally practiced in the United States, because it makes possible the transportation of a body, and because it destroys the danger of contagion.

**Embar'go**, the prohibition of foreign commerce through the detention of vessels in port. When the vessels of a foreign state are detained, the embargo is said to be *hostile*; when a state detains its own vessels the embargo is called *pacific*. The embargo policy was first used in the United States in 1794, in retaliation for hostile acts in restraint of American trade by Great Britain, but it was removed and was not again used until 1807, when the famous Embargo Act was passed, which detained both foreign and domestic vessels engaged in foreign trade. The act had but little effect upon France and England, the two countries at which it was directed, but it caused great hardship to American ship owners and was repealed in 1809, being replaced by the Non-Intercourse Act. Another act was passed in 1813, during the War of 1812.

**Embez'zlement**, the fraudulent appropriation of the personal property of another, held in the capacity of agent, servant or trustee. In order to constitute embezzlement, this taking must violate some confidence. Hence, if the user believes himself authorized to appropriate this money, he does not commit embezzlement. Also, the money must come into his possession by reason of his employment. In the case of the appropriation of such funds, the law presumes that the person has embezzled; however, if no criminal intent can be shown, he is released. The offense is a crime in the statutes of all states and is punishable by imprisonment, usually for a term of years.

**Emboss'ing**, the art of producing figures in relief upon plain surfaces, such as leather, paper, wood or bronze. Leather, paper and fabrics are embossed by means of presses, furnished with dies of the desired pattern. Embossing of metal may be done by hand, by beating up the metal from the under side, in which case the method is called *repousse work*. In architecture or sculpture the figures are said to be *alto-*, *mezzo-* or *bas-relief*, according to their prominence. In needlework, embossing is done by embroidering over figures which are padded with wool or some other material.

**Embroid'ery**, the art of making, with a needle and thread, ornamental designs on cloth or other materials. Embroidery is one of the oldest of decorative arts. The ancient Eryp-

## Embryology

tians and Assyrians practiced it to a considerable extent, and from them the Jews, Greeks and Romans learned it. The oldest known embroidery was done in cotton, linen and wool; later, silk came into greater favor. The Chinese and Japanese embroideries are very elaborate, most of the work being done upon silk, with the figures in brilliant colors of silk alone, or combined with gold and silver. Besides silk and gold threads, beads, spangles, pearls and gems are used in the embroidery of the Persians, Turks and Hindus.

In Europe, during the Middle Ages, the art was brought to the highest degree of perfection, and it was a favorite occupation among women of all ranks. In England it was of the highest importance, both as a recreation and as an industry. On clothing, as well as on curtains and wall hangings, rich embroidery was very fashionable. During the last half of the nineteenth century, machines were invented which make almost perfect imitations of hand embroidery. The best embroideries are made in Switzerland.

The principal stitches used in embroidery are chain stitch, cross, cushion, buttonhole, canvas, couching, rope, crewel and feather stitch. In embroidering elaborate designs the fabric is fitted and stretched over a frame.

**Embryology**, that division of anatomy which treats of the growth of individual organisms. The growth may start from an egg, a bud or a germ cell. The causes of development are unknown, though all forms are primarily due to the same cause. In one-celled animals, the cell increases in size without subdividing; in animals of more than one cell, cell division takes place. In the egg, the yolk serves as nutriment for the developing germ, which must be fertilized before growth commences.

**Emerald**, a well-known gem of pure green color, somewhat harder than quartz. It is a variety of beryl. Its color is due to the presence of chromium. Its natural form is either rounded or that of a short, six-sided prism. It is one of the softest of the precious stones, but is not acted upon by acids. Emeralds of large size and free from flaws are rare; the largest on record is said to have been possessed by the inhabitants of the valley of Manta, in Peru, when the Spaniards first arrived there. It was as big as an ostrich egg and was worshiped as *the mother of emeralds*. The ancients, who valued emeralds, especially for engraving, are said to have procured them from Ethiopia and Egypt. The finest are now obtained from Colombia. The

## Emerson

Oriental emerald is a variety of the ruby, of a green color, and is an extremely rare gem. Emeralds have been found in North Carolina.

**Emerald Isle**, a popular name for Ireland, given it on account of the rich green of its vegetation.

**Em'erson**, RALPH WALDO (1803-1882), an American poet and essayist, born in Boston, Mass. He graduated at Harvard in 1825, taught school for five years and in 1829 became



RALPH WALDO EMERSON

minister of a Unitarian church in Boston. As he had given up teaching because it was uncongenial, so he gave up preaching, although it seems that he was most successful, because he could not accept various rites of the Church, as that of the Lord's Supper. In 1832 he made a trip to England, where he became acquainted with Walter Savage Landor, Wordsworth, Coleridge and Carlyle. With Carlyle he established a firm friendship, and their correspondence was continued for years.

Returning to the United States, he began his career as a lecturer, and it was in this capacity that he was for a long time best known. His lectures on science, history and biography were very popular, by reason of their exhaustless fund of wit, illustration and anecdote. In 1835 he married Miss Lilian Jackson and took up his residence at Concord, Mass. His first volume, published in the following year, was *Nature*, in which he definitely set forth his creed; and this



## Emery

increased greatly the reputation which he had made by lecturing. As a member of the group known as Transcendentalists, Emerson was one of the original editors of the *Dial*, a transcendental magazine, founded in 1840. Despite his identification with this movement, he had little to do with the Brook Farm scheme, of which he saw the impracticability from the beginning (See BROOK FARM).

Among Emerson's most important publications were *Essays* in 1841 and 1844; *Poems* in 1846; *Representative Men*, 1850; *The Conduct of Life*, 1860; *May Day and Other Poems* and *Society and Solitude*, in 1861. *The Sphinx*, *The Humble Bee*, *The Threnody*, written on the death of his son, *Days*, the *Snowstorm* and *Each and All* are some of his best-known and best-liked poems. Perhaps the most important of Emerson's messages to the world was his teaching that man may rise above circumstances and environment and may make of himself what he chooses; and it is largely through such philosophy as this that he has exerted so wide an influence. See halftone, CONCORD.

**Em'ery**, an impure variety of corundum, of blackish or bluish-gray color, chiefly found in shapeless masses and mixed with other minerals. It contains about 82 per cent of alumina and a small portion of iron, is very hard, is infusible and is not attacked by acids. The best emery is brought from the Levant, chiefly from Cape Emeri in Naxos. It also occurs in Spain. It is employed in cutting and polishing precious stones; in smoothing the surface of the finer kinds of lenses, preparatory to their being polished; in the polishing of marble; by cutlers, locksmiths, glaziers and other artisans. For all these purposes it is pulverized in large iron mortars or in steel mills, and the powder, which is rough and sharp, is carefully washed and sifted into eight or ten different degrees of fineness. Emery paper and emery cloth are made by laying a thin coat of glue upon the fabric, and dusting the emery from a sieve of the required size.

Emery wheels are made of a cement in which the ground emery is contained, and the excellence of the wheel depends upon the nature of the cement. The aim is to make a cement which will wear away with the emery and not leave the cutting material below the surface of the wheel. The cement must also be strong enough to withstand the centrifugal force so that it will not fly to pieces when the wheel revolves at a high speed. The wheel must have

## Eminent Domain

an even texture throughout and must have the same density, so that one side will not wear out before the other and thus throw the wheel out of balance. Various kinds of cement are made—for example, leather, treated with acids and a strong glue, hard rubber, litharge, linseed oil, shellac, celluloid, silicate of soda, chloride of calcium, glue and oxychloride of zinc. The emery is prepared for mixing with the cement by rolling or crushing the rock. For cutting and grindstone purposes, the emery crushed under a stamp or in a rock crusher is the best, as the corners and edges of the particles are sharper; but for polishing, the emery ground between rollers is preferred. Wooden wheels with leather glued to their rims, and emery powder glued on to the leather, are used for polishing. The wooden wheel is built up from segments glued and pinned together. Buffing wheels for polishing brass, nickel-plated surfaces, copper, gold and silver are made of cotton or woolen cloth cut into disks and held together by iron flanges in the center.

**Em'ery Wheel.** See EMERY.

**E'meu.** See EMU.

**Em'igra'tion.** See IMMIGRATION.

**Émigrés**, *a me gra'*, the name applied to those royalists who fled from France during the French Revolution. After the storming of the Bastille in July, 1789, the first exodus took place, and later in the same year, at the time of the attack on Versailles, a larger number left the country. In 1791, when the Constitution was adopted, another large party left, most of them taking refuge in Holland, Germany or Switzerland. Throughout their exile the émigrés were constantly intriguing with foreign kings to bring about the restoration of the monarchy, and the knowledge of this fact drove the revolutionists to desperation and had much to do with many of the atrocities which were committed. Napoleon, on gaining the consulship, permitted the return of the émigrés. At the time of the Bourbon restoration, they were refused the right to regain their estates or privileges.

**Em'inent Domain'**, the right of a state to appropriate the property of its citizens for public uses. This right is akin to the state's right to take property by taxation. It does not lead to confiscation, since it is always done through the forms of the law, always for the public good and usually for compensation. It is far more common in the United States than in any other country. Congress, with whom the power lies, is limited, in its exercise, by

several clauses of the Constitution, which declare that no person shall be deprived of property "without due process of law," and that "private property shall not be taken for public use without just compensation." The several states, which also possess the right of eminent domain, are also usually limited by similar provisions in their constitutions. The purposes for which the right may be exercised are many, according to the decisions of the courts, including not only improvements under the direction of the government, but the enterprises of persons in a private or semi-public capacity, such as railroads, bridges and ferries,

**Emin Pasha**, *a'meen pa shah'* (1840-1892), whose real name was Eduard Schnitzer, was an African explorer, governor and army surgeon, born at Oppeln, Prussia. He studied at Breslau, Berlin and at Königsberg, taking his degree in medicine. In 1865 he was appointed surgeon of the Turkish army, and ten years later he went to Egypt, where he became surgeon-general of the Egyptian army in the Sudan. In 1878 General Gordon appointed him governor of the equatorial provinces in the southern Sudan. He made various exploring expeditions, giving to the world much information in reference to the animal life and vegetation of that region and also much geographical knowledge. In 1883 he was cut off from the civilized world by the insurrection of the dervishes under the Mahdi, but held his position, and in 1887 the Egyptian government made him a pasha. He was rescued by Henry M. Stanley, but continued to stay with his people. In 1889 the provinces rose in revolt, and he was deposed and imprisoned, and after this he left the country. The next year he entered the service of the German East Africa Company and went on an exploring expedition into East Africa, where he was assassinated by two Arabs.

**Em'met**, ROBERT (1778-1803), an Irish patriot. He was expelled from Trinity College, Dublin, in 1798, on the ground of exciting disaffection and rebellion, and he then quitted Ireland. After spending some time on the Continent and receiving from Napoleon a promise of aid in a struggle for Irish independence, he returned to Ireland and became a member of the Society of United Irishmen, for the establishment of the independence of Ireland. In July, 1803, he was the ringleader in the rebellion in which Lord Kilwarden and others perished. He was arrested a few days afterward, tried and executed. His speeches in his own vindication

have been regarded as models of patriotic eloquence.

**Emo'tions**, the higher feelings of the mind, which are aroused by ideas and exercised towards specific objects. They are sometimes called *ideal feelings* (See FEELING). Emotions differ from feelings in being more complex. Mere feeling is a simple act of the mind, but an emotion, such as love, brings into activity all the mental powers. One's love for one's mother is actuated by a knowledge of her, by recalling all she has done for one and by picturing what life might have been without her care. Perception, memory, imagination, reason and feeling are all employed. There is, however, no sharp line of division between mere feelings and emotions. We cannot say just where one ends and the other begins.

The emotions have been variously classified by different authorities. Professor William James says, "Any classification of the emotions is seen to be as true and as natural as any other, if it only serves some purpose." The most useful classification divides the emotions into the egoistic, the altruistic, the moral and the religious. The egoistic relate wholly to the self; the altruistic, such as love and anger, are exercised towards objects outside the self, and the moral and religious are combinations of both the egoistic and the altruistic.

The egoistic and altruistic emotions have the same relation to the self as do the egoistic and altruistic feelings (See FEELING, subhead *Ideal Feelings*). The esthetic emotion is purely altruistic, and its development has given rise to the branch of philosophy known as *esthetic* (See ESTHETICS). The moral emotions arise from relations of human beings to one another. They give us the sense of right and wrong, and in so far as they are responsible for our moral standards are strongly egoistic, while in so far as they are exercised towards others, they are altruistic (See ETHICS). The religious emotions are closely allied to the moral and arise from contemplating one's relation to a supreme being. They constitute the highest sentiments of which the mind is capable (See RELIGION).

The emotions are expressed in a variety of ways, by the eyes, by the countenance, by gesture and by the tones of the voice, as well as by words. When they are strong they affect the organic functions, such as breathing, circulation and digestion. The emotions increase in strength by continued excitement of them and they exert a strong influence over character and happiness.



## Empedocles

When they pass beyond the control of the will, emotions become passions. For culture of the emotions, see **FEELING**, subhead *Culture of Feelings*.

**Empedocles**, *em ped'o kleez* (flourished about 444 B. C.), a Greek philosopher of the Eclectic school. His teaching was that all things were produced by the action of Friendship and Strife on the four elements, earth, air, fire and water. He also taught that man was made up of the same elements as the universe, or else he would be unable to understand the universe. One legend told that Empedocles met his death by jumping into the crater of Mount Etna.

**Em'peror**, a title given to a ruler of superior rank to a king; specifically, the supreme ruler of an empire, that is, of a jurisdiction comprising a variety of nationalities or separate territories, as the emperor of Austria-Hungary; the emperor of Russia; Edward, emperor of India. See **IMPERATOR**.

**Em'pire**. See **EMPEROR**.

**Employ'er's Liability**. See **MASTER AND SERVANT**.

**Empo'ria**, **KAN.**, the county-seat of Lyon co., 60 mi. s. w. of Topeka, on the Atchison, Topeka & Santa Fé and the Missouri, Kansas & Texas railroads. The city is in a region devoted to farming and stock raising and contains large wholesale houses, foundries, woolen and flour mills and canning, carriage and other factories. A state normal school is located here, and the city also contains the College of Emporia and a conservatory of music. It was settled in 1856 and was incorporated in 1870. Population in 1910, 9058.

**Ems**, a watering place in Hesse-Nassau, on the Lahn River, about 10 mi. e. s. e. of Coblenz. It is noted for its many warm mineral springs, which are famous for their curative powers, especially in lung diseases. The place is visited by over 10,000 patients and many tourists every year. In the neighborhood are very important silver and lead mines. Ems was known to the Romans. In 1172 the counts of Nassau gained possession of it, and in 1866 it was united with Prussia. At this place, in 1870, the famous interview between King William of Prussia and the French ambassador, Benedetti, took place, which brought on the Franco-Prussian War.

**E'mu**, or **E'meu**, an Australian bird, related to the ostrich, cassowary and rhea. It is a large bird, sometimes weighing 130 pounds, and so

## Enamel

is second only to the ostrich in size. Its feet are three-toed, and its feathers, which are double, are of a dull, sooty brown, those about the neck and head being hair-like in texture. It has small, useless wings, but it can run with great speed and uses this method of escape from enemies on the plains. If cornered, however, it can fight viciously, kicking backward with force sufficient to break a man's leg. The emu is very easily tamed and may be kept out of doors in temperate



EMU

climates. The flesh of the young is said to be a delicacy.

**Emul'sion**, a milky white medical preparation, consisting of an oily or resinous substance, made to combine with water by some substance that itself has the property of combining with both.

**Enam'el**, a glass-like glaze of various colors, fused to the surface of gold, silver, copper and other substances. The art of enameling, which is of great antiquity, was practiced by the Assyrians and by the Egyptians, from whom it may have passed into Greece and thence into Rome and its provinces, where various Roman antiquities with enameled ornamentation have been discovered. During the twelfth and fourteenth centuries, the Italians acquired great skill in enameling, and their work became famous in all the countries of Europe. The basis of all

kinds of enamel is a perfectly transparent and fusible glass, which is rendered either semitransparent or opaque by the mixture of metallic oxides. White enamels are composed by melting the oxide of tin with glass and adding a small quantity of manganese or phosphate of calcium to increase the brilliancy of the color. The addition of the oxide of lead, or antimony, or oxide of silver, produces a yellow enamel. Reds are formed by copper, and by an intermixture of the oxides of gold and iron. Greens, violets and blues are formed from the oxides of copper, cobalt and iron. Enamel is used for glazing the cheaper varieties of pottery and for coating iron vessels for domestic purposes, the protection of the insides of baths, cisterns, boilers and the like. Enameling in colors upon iron is now common, iron plates being thus treated by means of various mixtures, and words and designs of various kinds being permanently fixed upon them by stenciling.

**Encaus'tic Painting**, a method of painting practiced by the ancients, especially the Greeks, in which the colors were mixed with wax and resin and were softened by the aid of fire. Little is definitely known of the process, but the specimens left to us show the wonderful enduring qualities of the colors. *The Battle of Marathou*, painted by Polygnotus, for instance, was preserved for more than nine hundred years in an open portico at Athens. The art has been revived in modern times, but not to a great extent.

**Encaustic Tiles.** See **TILES**.

**Ency'clope'dia** or **Cy'clope'dia**, a systematic view of the whole extent of human knowledge or of particular departments of it, with the subjects arranged generally in alphabetical order. Varro and Pliny the Elder, among the Romans, attempted works of an encyclopedic nature, the latter in his well-known *Historia Naturalis*, or *Natural History*. Other ancient encyclopedic works were those of Stobæus, Suidas, Isidorus and Marcianus Capella. In the thirteenth century a work on a regular plan was compiled by the Dominican Vincent of Beauvais, in which was exhibited the whole sum of the knowledge of the Middle Ages. This work was called *Speculum Majus*, or *Speculum Triplex* (triple mirror) and was avowedly a digest of earlier works. The first compilation to which the name encyclopedia was given was one published in 1559 by Paul Scalich. A Latin encyclopedia, published by Heinrich Alsted in 1630, purported to tell all that was

known of all the sciences, and it was long the standard work of its class. These early works, while crude and unsystematic, were yet a step in the right direction toward the classification of knowledge. The subjects were arranged topically in these works, and it was not until 1674 that an important work with its subjects arranged alphabetically was issued. This was the *Dictionnaire historique* (historical dictionary) of Louis Moréri, which included articles on historical, mythological, genealogical and biographical subjects. In 1697 appeared Bayle's famous *Dictionnaire historique et critique*, which in its later revisions is still of value.

The first English alphabetical encyclopedia was the *Lexicon Technicum; or an Universal English Dictionary of Arts and Sciences*, published in 1704. Ephraim Chambers published in 1728 his *Cyclopaedia; or an Universal Dictionary of Arts and Sciences*, which had some distinctive features, especially the use of cross-references to facilitate topical reading, and which had considerable influence on succeeding works of its kind, both in England and on the Continent. The famous French *Encyclopedie*, edited by Diderot, D'Alembert, Rousseau and others, was intended at first as a translation and revision of Chambers's work, but grew into something much more ambitious (See **DIDEROT**, **DENIS**). Of a somewhat different type from the dictionary style of encyclopedia, described above, is the *Encyclopaedia Britannica*, first published in 1768, which laid stress on important articles on general subjects, rather than on numerous short articles on the subdivisions of these subjects.

Besides those mentioned above, the chief encyclopedias in English include a new edition of *Chambers's Encyclopaedia*, in ten volumes; the *Encyclopedia Americana*, in sixteen volumes; Johnson's *Universal Cyclopaedia*, in eight volumes; later editions of the *Encyclopaedia Britannica*, the latest in twenty-nine volumes, and the *New International Encyclopaedia*, in twenty volumes. Of French encyclopedias the most important are the *Encyclopedie des gens du monde*; the *Encyclopedie moderne*, and the *Encyclopedie du XIX<sup>eme</sup> siecle*. The German *Konversations-Lexikon* of Brockhaus, in seventeen volumes, and the *Konversations-Lexikon* of Meyer, in eighteen volumes, with supplementary numbers, are among the best and most scholarly of any encyclopedias. The Chinese encyclopedia, complete in 5040 volumes, is one of the most remarkable literary under-



takings ever projected, and has twenty volumes of index alone.

**En'dicott**, JOHN (1588?-1665), one of the founders and the first governor of Massachusetts Bay Colony. He was born in Dorchester, England, and joined the exodus of Puritans to the New World in 1628. He was acting governor of the colony during the following year and was elected governor in 1644, 1649 and annually from 1651 to 1665, except 1654. Endicott was a warm disciple of Roger Williams and always displayed independence of established custom and authority. He was responsible for the establishment of a colonial mint in 1652. During his administration several Quakers were put to death in Boston.

**Endicott**, WILLIAM CROWNINSHIELD (1827-1900), an American politician and jurist, born at Salem, Mass., educated at Harvard University. He was admitted to the bar in 1850 and was chosen to the state supreme court in 1873, serving for ten years. Until the dissolution of the Whig party he acted with that organization, but then became a Democrat. In 1884 he was candidate for governor of Massachusetts, but was defeated, and in the following year he became secretary of war in Cleveland's cabinet, serving throughout his term.

**Endless Screw**, a mechanical contrivance, consisting of a screw, the thread of which gears into a wheel with skew teeth, the obliquity corresponding to the angle of pitch of the screw. The endless screw is generally employed as a means of producing slow motion in the adjustments of machines, rather than as transmitter of any great amount of power.

**Endogenous**, *en doj'e nus*, **Plants**, formerly the name of one of the large primary classes into which the vegetable kingdom is divided. It has now given way to the name *monocotyledons*. See BOTANY.

**Endym'ion**, in Greek mythology, a shepherd of great beauty, who won the love of Diana. Seeing him one night as he lay asleep on a hillside, Diana left her chariot and kissed him. This she repeated every night, but while Endymion waked enough to gaze into her eyes, he was never able to make any response. Fearful lest age should lessen his beauty, Diana begged for him from Jupiter the gift of endless sleep and carried him off to a cave on Mount Latmos.

**En'emy**, in international law, a nation at war with another, or any one of its citizens or officers, from the standpoint of the other nation and its citizens and officers. A state of enmity does not

exist between two nations until they are actually at war. While any officer of a belligerent nation is considered, strictly, an enemy of the other party to the struggle, modern usage has practically determined that minor civil officers, not in any way connected with the war, and non-combatants of nations at war are not liable to capture, detention or punishment. All commercial relations, however, are suspended. For a statement of the general rules of international law in force during times of war, see articles WAR; INTERNATIONAL LAW; NEUTRALITY.

**Energy**, *en'ur jy*, in physics, the power which a body or system possesses for doing work. Energy is of two kinds, *potential*, or possible, energy, which is energy of position, like that of a sledge in air or a stone resting upon a support to which it has been elevated, or the force which lies dormant in such mixtures as gunpowder and dynamite. In all these cases the energy is present and only needs the necessary conditions to change it from possible, or passive, to *kinetic*, or active, energy. This energy produces motion, like the sledge descending on the head of a stake, the stone rolling downhill or the powder in explosion.

**CHANGE OF ENERGY.** Energy can be changed or transformed from one sort to another, but it can be neither created nor destroyed. An electric light plant using steam power affords an excellent illustration both of the change of potential to kinetic energy and also of the change from one kind of energy to another. The potential energy in coal is made active by burning, which causes it to give off heat. The heat is used in changing the water to steam and this is then transformed to motion in the engine. The motion is imparted to the dynamo, which in turn generates the electric current, which is changed back to heat in the electric light. Some of the heat generated by the coal is consumed in the running of the engine and the dynamo and in traversing the wires, so that it does not all appear as light; yet it is all used in one form of energy or another.

**En'field**, CONN., a town of Hartford co., 18 mi. n. of Hartford, on the Connecticut River and on the New York, New Haven & Hartford railroad. There are powder mills, carpet factories, bicycle factories, steam brick works and various other manufactories, and the tobacco trade is especially important. The town has a community of Shakers, which is known as Shaker Station. Population in 1910, 9719.

**Eng'elmann**, GEORGE (1809-1884), a German-American botanist, who was educated in the universities of Heidelberg and Berlin, and practiced medicine in Saint Louis, edited a German newspaper and acted as botanist in the government surveys of North America. By his will he left to the Missouri Botanical Gardens his large herbarium and his library.

**Engine.** See GAS ENGINE; STEAM ENGINE.

**Engineer'ing**, in its broadest meaning, the art of construction. Engineering is one of the oldest of arts, and the remains of Egyptian temples and tombs as well as the pyramids are evidences that these people were well versed in engineering. The ruins of ancient Babylon and other cities of the East also bear evidence of the skill in engineering possessed by the Assyrians, the Greeks and other ancient nations. But the Romans attained the greatest skill in this art, as shown by the magnitude of their works and the architectural devices employed in their construction. The development of numerous lines of industry, each of which calls for special applications of engineering, has led to the division of the art into several sections, all of which may be graded under two main divisions, known as *military engineering* and *civil engineering*. Military engineering deals with those engineering operations connected with warfare, both on land and sea. That department connected with the construction of ships and other naval affairs is termed *marine engineering*, and the work of the military engineer is related to the construction of roads, fortifications and other defenses.

Civil engineering is the term applied to all kinds of construction not designed for military or naval purposes. It pertains to the construction of large buildings, bridges, canals, harbors, railroads, street railways and numerous other works. This branch of the art is subdivided into numerous departments, such as *electrical engineering*, *mechanical engineering* and *sanitary engineering*, each of which has become highly specialized.

**England**, the chief political division of the United Kingdom of Great Britain and Ireland, occupying the southern portion of the island of Great Britain. It is separated from Scotland by the Cheviot Hills, the River Tweed and Solway Firth. Its greatest length from John o'Groats, in the northeast, to Saint Alban's Head, on the south, is 365 miles, and its greatest width from Land's End to North Foreland is 320 miles. The area, exclusive of the Channel Islands, is

50,933 square miles, or a little more than that of the State of New York. The coast line is very irregular and measures about 2000 miles. On the east are the following important indentations, each of which is the estuary of one or more rivers: Tees Bay, the Mouth of the Humber, the Wash and the Mouth of the Thames. On the south are Spithead, Lyme Bay and Plymouth Sound, and on the west are Bristol Channel and the estuary of the Severn, south of Wales, the estuary of the Dee, north of Wales, and Morecambe Bay and Solway Firth. England and Wales are separated from Ireland by the Irish Sea and Saint George's Channel; the English Channel, Strait of Dover and North Sea separate England from Europe.

**SURFACE AND DRAINAGE.** The northern and northwestern portion contains a number of ranges of mountains and hills which, with some interruptions, extend north and south from Scotland through England into Wales. These throw out numerous branches on both sides, but particularly to the west, where all of the highest summits are found. The northern portion of the main range of mountains is known as the Pennine chain. The highest summit of this range is found in Derbyshire and rises to the height of 2080 feet, while the highest summit of northern England, Scawfell, also in this region, has an altitude of 3210 feet. West of the Pennine range and its adjoining Cumbrian range is another, whose average altitude is greater. This extends southward and covers the greater part of Wales. South of the Bristol Channel and extending into the point of land comprising the counties of Somerset, Devon and Cornwall, is the Devon range, which is much lower than the ranges in the north. In the extreme northwest, between Morecambe Bay and Solway Firth and occupying the counties of Cumberland and Westmoreland, is the Lake District, so called because it contains a number of small mountain lakes, noted for their beauty. All of the southern and eastern portion of England is low land and consists of rolling country, with slight rounded elevations separated by more or less broad, undulating valleys.

England is well supplied with rivers, many of them of great importance to industry and commerce. Nearly all of these flow into the North Sea. The most important streams are the Thames, Ouse and Humber, flowing into the North Sea, and the Mersey and the Severn flowing into waters tributary to the Atlantic. Other streams worthy of mention are the Tyne, Wear



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and Tees, in the northeast, and the Eden, Ribble and Dee, in the northwest.

CLIMATE. See GREAT BRITAIN, subhead *Climate*.

MINERAL RESOURCES. England contains extensive deposits of coal, iron ore and clays, and it furnishes about three-fourths of the entire mineral products of the United Kingdom. Minerals of lesser importance are copper, zinc, tin, salt and gypsum. The coal areas extend irregularly from north to south, slightly west of a line drawn through the center of the country. The most important coal-producing counties are Durham, Lancashire and Yorkshire, in the north. The next most important region is that round about Newcastle. The iron ore and limestone necessary for a flux in smelting occur in or near the coal regions. Tin in quite large quantities is found in Devon and Cornwall. Since England contains an abundance of coal and is so situated that this can be transported easily, a considerable quantity is exported to adjoining European countries.

FISHERIES. The fisheries are important, and the larger part of the fish taken by the United Kingdom is obtained off the coasts of England and Wales. The total value of the annual catch is about \$32,000,000. The most important centers of the industry are Grimsby, Hull and Yarmouth, and nearly all of the product goes to London, which is the largest fish market in the world. Herring, haddock, cod and mackerel are the varieties taken in largest numbers.

AGRICULTURE. Over three-fourths of the land is under direct or indirect cultivation, and less than one-eighth of it is left in a natural state. Nearly all of the land is held in large estates, which are subdivided into small farms and rented to permanent tenants. Since these estates are inherited by the oldest sons in the families, their management is seldom changed, and it is a very difficult matter to divide them. The land is kept in a high state of fertility by the use of fertilizers and by the most approved methods of tillage. Wheat, oats and barley are the principal cereal crops. Green crops and root crops are extensively grown for forage. Besides these are potatoes, beets, beans, peas and hops, and in the southern part of England, apples and other fruit form an important product. The raising of live stock is also an important line of agricultural industry, and England has long been noted for her excellent breeds of cattle, sheep and swine. It is from her that the Durham and Devon cattle, Southdown, Cotswold and Leices-

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tershire sheep and other valuable varieties of domestic animals have been obtained (See CATTLE; SHEEP). In many sections intensive farming, similar to that practiced in the truck gardens around the large cities in the United States, is common, and the land yields large crops, but notwithstanding this the returns are far from sufficient to supply the people of the country with food.

MANUFACTURES. Next to the United States, England is the greatest manufacturing country in the world, and manufactures form the leading industry, more than five times as many people being engaged in manufacturing as in agriculture. The chief manufacturing centers are in the vicinity of the coal and iron fields, extending from the center of the country northward along the western side. The most important industry is the manufacture of textiles, in which cotton and woolen goods take the lead. Manchester is the chief city of cotton manufacture and the largest center of this industry in the world, and the county of Yorkshire contains the largest number of woolen mills, the center of the industry being at Leeds. The great iron foundries are found in the central counties in and about Birmingham and Sheffield, the latter city being noted for its manufacture of cutlery of all kinds. Aside from these great industries, there are numerous others, such as the manufacture of pens, pins, needles and countless other small articles and small wares. In itself each of these industries is comparatively unimportant, but when taken together, they constitute an important factor in the manufacturing industry of the country and of the world.

The position which England has held for so long as a manufacturing nation is due to the presence of large quantities of coal and iron, to her moist and temperate climate, to facilities for reaching the markets of the world and, perhaps more than all else, to the ingenuity and industry of her people. It was in this country that the four inventions which have revolutionized the industries of the world were produced. These were the power loom, invented by Edward Cartwright; the steam engine, by Watt; the locomotive, by Stephenson, and the Bessemer process of manufacturing steel. For fuller descriptions see, respectively, the articles on LOOM; STEAM ENGINE; LOCOMOTIVE; STEEL, subhead *Bessemer Steel*.

TRANSPORTATION AND COMMERCE. See GREAT BRITAIN, subhead *Transportation and Commerce*.

GOVERNMENT AND RELIGION. See GREAT BRITAIN, subheads *Government* and *Religion*.

EDUCATION. See EDUCATION, NATIONAL SYSTEMS OF, subhead *Great Britain*.

LITERATURE. See LITERATURE, subhead *English Literature*.

ART. See PAINTING; SCULPTURE, subhead *England*.

ARCHITECTURE. See ARCHITECTURE, subhead *Gothic Architecture*.

INHABITANTS AND LANGUAGE. The ancient inhabitants of England were known as Britons and were a Celtic people (See CELTS). At the Roman conquest the people occupying what is now England were brought under Roman rule, while some of the hardier tribes fled to the north and maintained their independence. On the evacuation of the island by the Romans, after a rule of about five hundred years, the inhabitants on the north encroached upon those living in the former Roman territory, and the latter invited the Saxons, Angles and Jutes to assist in repelling these northern tribes. After rendering the assistance called for, these people settled in England and intermarried with the Britons. Later, in the eleventh century, there was an invasion of the French under William of Normandy. As a result, the English people are the offspring of intermarriages between these various nationalities. They are characterized by love of liberty, great endurance, strong intellectual attainments, mechanical skill and executive ability. From England they have spread to America, Africa and many other parts of the world. English is the language universally spoken, and the proportion of other nationalities in the country is comparatively small. The population in 1911, exclusive of Wales, was 34,043,076.

CITIES. Besides London, the capital, the great commercial center of the world, with a population of over 7,000,000, there are in England fourteen other cities having a population of over 200,000. These are, in the order of their importance, Liverpool, Manchester, Birmingham, Leeds, Sheffield, Bristol, Bradford, West Ham, Kingston-upon-Hull, Nottingham, Salford, Newcastle-upon-Tyne, Portsmouth and Leicester. Each of them is described under its title.

HISTORY. Previous to the time of the Roman conquest of Britain in the first century B. C., little is known of England beyond the fact that it was frequently visited by the Phoenicians, the Carthaginians and the Greeks, for the purpose of obtaining tin. With Caesar's invasion

of the country in 55 B. C., its recorded history begins. It was not, however, until the time of Claudius, nearly one hundred years later, that a serious attempt was made to reduce Britain to the condition of a Roman province, and it was not until the time of Agricola that the inhabitants may be said to have been in any degree Romanized (See AGRICOLA). The entire island did not submit to the Romans at any period, and at various times walls were built across it to ward off the attacks of the northern tribes whom the Romans had been unable to subdue. Under the Roman dominion the southern part of the island advanced considerably in civilization. Flourishing towns were built, great roads were constructed and Christianity was introduced.

But soon after the beginning of the fifth century, the Romans found it necessary to withdraw their armies from Britain, and the inhabitants of the country, who had been for centuries protected by the Romans, found themselves utterly unable to repel the invasions of their northern neighbors. They therefore called on the Jutes to aid them, but soon found that the Jutes intended to repay themselves by making settlements on the island. Other tribes from the mainland, chief among them the Angles and the Saxons, also descended upon Britain and soon overran the country.

Of the political divisions into which the conquered territory was divided by the Angles and Saxons, the most conspicuous were the seven small kingdoms commonly known as the *Hep-tarchy*. Gradually the more powerful of these came to dominate the weaker ones, and by 827 Egbert, king of Wessex, had made himself king of the entire country. From this year the kingdom of England (Angle-land) may be considered to date, and Egbert's descendants ruled in England, with the exception of a short period of Danish power, until 1066. In the early strife between the Angles and the Saxons, the civilization of the Romans had been completely overthrown, and Scandinavian mythology had taken the place of Christianity. By the sixth century, however, the Christian religion had been reintroduced by Saint Augustine and his successors.

Meanwhile, the Danes had been constantly harassing the coast, and they gradually obtained a firm foothold on the island. When Alfred the Great ascended the throne, in 871, he found them practically masters of his kingdom. But he succeeded in reducing their power, confined them to a certain part of the country and forced



them to do him homage (See ALFRED THE GREAT). The successors of Alfred, Edward (901-925) and Athelstan (925-940), were again obliged to contend with the Danes, who were constantly issuing from the Danelagh, the territory to which Alfred the Great had confined them. Among the chief political characteristics of the rule of the Saxons in England was the growth of the power of the king, and the early establishment of the Witenagemot, without the sanction of which the king was supposed to undertake nothing of importance. A really strong king, however, might often set aside the Witan and rule almost absolutely (See WITENAGEMOT).

By 1013 the Danes under Sweyn had made themselves masters of the greater part of England, and Sweyn's son Canute, who succeeded him in 1016, firmly established the Danish rule. Harold and Hardicanute succeeded Canute, and on the death of Hardicanute in 1042 the English line again came to the throne in the person of Edward the Confessor (See EDWARD THE CONFESSOR). Edward died in 1066, and Harold, his brother-in-law, was chosen king (See HAROLD I). He ruled but a few months, however, as William of Normandy, who claimed the throne partly through his relationship to the royal Saxon line, partly through a promise which he said had been made him by Edward the Confessor, descended upon England in 1066 and defeated Harold at the Battle of Hastings. By Christmas day William had brought a large part of the island into subjection, and on that day he was crowned in London. It was not until some years later, however, that the complete subjugation of the island was accomplished (See WILLIAM I).

At William's death in 1087 his second son came to the throne as William II, and he was followed on his death in 1100 by his younger brother Henry. Henry's reign was much disturbed by the attempts of Robert, duke of Normandy, eldest son of William I, to gain the throne, but Henry was able to strengthen his hold on the kingdom and even to gain possession of Normandy. Henry had chosen as his successor his daughter Matilda, wife of Geoffrey Plantagenet, count of Anjou, but Stephen, a grandson of William the Conqueror, raised an army in Normandy and attempted to seize the throne. After years of fighting with varying results it was agreed that Stephen should reign until his death, and that he should accept as his successor Henry, the son of Matilda. Stephen

lived but a year after this arrangement was made, and in 1154 Henry, the first of the Plantagenets, came to the throne as Henry II.

Henry II proved to be one of the strongest of English kings. He put down the great barons who had established themselves in their castles and made themselves scourges to the country about them, and he established a just and orderly government. One of the most important events of his reign was his contest with the Church, the powers of which, despite his enforced submission to the pope after the murder of Becket, he very materially lessened. (See BECKET, THOMAS A.; CLARENDON, CONSTITUTIONS OF). Henry, whose possessions in France exceeded in extent his English kingdom, had spent little of his time in England, and his son, Richard I (1189-1199), who succeeded him, was in England only one year during his reign. In his absence the nobility succeeded in increasing their power at the expense of the royal authority. John (1199-1216), who succeeded Richard, while in some ways an able man, was untrustworthy and weak, and during his reign England lost all of her possessions in France. This separation of the two countries in the end worked good to England, as it compelled the Norman barons in England, who up to this time had thought of France as their home country, to recognize themselves as subjects of an English king. John's weakness was beneficial to England in another way, because it allowed the barons, with the support of the people, to wrest from him the Great Charter of Liberties (See JOHN; MAGNA CHARTA). John's son, Henry III, (1216-1272) succeeded him, and much of this reign was taken up with troubles with the barons, which in the end resulted in a confirmation of the Great Charter. It was during this reign that the first House of Commons was assembled. See HENRY III; MONTFORT, SIMON DE.

Edward I (1272-1307) proved himself a stronger king than his two predecessors and reduced the country to order. It was in his reign that Wales was finally united with England, and that the fierce struggle with Scotland began, which continued, at intervals, for centuries. Edward, by his defeat of William Wallace, gained some advantage in Scotland, but under Edward II this was lost, and after the victory of Robert Bruce at Bannockburn in 1314, the independence of Scotland was recognized (See EDWARD I; WALLACE, WILLIAM; BRUCE, ROBERT; EDWARD II). With Edward III (1327-1377) began the long struggle with France

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known as the Hundred Years' War (See HUNDRED YEARS' WAR). Edward, with his son, the Black Prince, won brilliant victories, which, however, meant no permanent advantage for England, while the great expense of the war was a serious drain on the country. Two important results of the contest to England were the strengthening of the national feeling, which resulted from the union of the Normans and Saxons against France, and the increased power which Parliament secured because Edward III was dependent upon it for supplies.

Richard II (1377-1399) proved but a weak king, and after several uprisings, chief of which was the insurrection under Wat Tyler (See TYLER, WAT), he was dethroned by Henry, duke of Lancaster, who came to the throne as Henry IV. The persecution of the Lollards and the frequent rebellions headed by supporters of the deposed king, Richard, were the chief events of this reign, which, however, was of importance in the growth of constitutional government in England by reason of Henry's respect for the authority of the Parliament which had proclaimed him king. The reign of Henry V (1413-1422) was spent chiefly in the prosecution of the Hundred Years' War, and so successful were the English that Henry was able to wring from the French king, Charles VI, a promise that the English king should succeed him on the throne of France. After the death of Henry V and the succession of his son, Henry VI, who was but a boy, the French, with the aid of Joan of Arc, defeated the English and obliged them to relinquish their claims on France (See JOAN OF ARC).

In the reign of Henry VI (1422-1461) began the long factional struggle known as the Wars of the Roses (See ROSES, WARS OF THE). In the course of these wars Henry VI was several times dethroned and again restored, but ultimately Edward IV, the head of the House of York, firmly established his hold on the throne. After the short reign of Edward V, which was a reign in form only, Richard III usurped the power, but he was overthrown in 1485 at the Battle of Bosworth, and Henry, earl of Richmond, came to the throne as Henry VII. The new king was a man of ability, and he successfully upheld the royal authority, at the expense of Parliament and the nobles, so that his son, Henry VIII (1509-1547), found himself, at his accession, in the possession of great power.

The reign of Henry VIII was chiefly noteworthy for the beginnings of the Reformation

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in England (See REFORMATION; HENRY VIII), which arose not through any desire of Henry's to found a new ecclesiastical system, but from a contest of the king with the pope on a personal matter. Edward VI (1547-1553), Henry's son, carried on the work of the Reformation, but on the accession of Henry's daughter Mary (1553-1558) the most strenuous efforts were made to restore the Catholic religion. Cranmer, Ridley and Latimer were the most illustrious of the many victims of this attempt to crush out the Reformation in England (See MARY I). Mary's efforts, however, were in the end vain, as her half-sister, Elizabeth (1558-1603), on her accession reestablished the reforms which her father had instituted, and by the Act of Supremacy had herself proclaimed head of the Church in England. One important result of this move of Elizabeth's was the increase in the feeling of nationality in England, and this growth was also promoted by the defeat of the Armada (See ARMADA). During Elizabeth's reign Ireland was entirely reduced to dependence on England. (For other important events of this reign, see ELIZABETH; MARY STUART.)

When Elizabeth died, James VI of Scotland, son of Mary Queen of Scots, succeeded her on the throne as James I, but despite this union of the crowns of the two countries, a complete union was not accomplished for over one hundred years. At the outset of his reign, James, by his statement of the doctrine of the "divine right of kings," instituted the controversy with Parliament which ended so disastrously for his son (See JAMES I). This reign is noteworthy in the history of America, because during it were founded the colonies in Virginia and in Massachusetts.

Almost immediately after the accession of Charles I (1625-1649), the struggle with Parliament reached a crisis. Charles prorogued his first two Parliaments, and although he was compelled by the Parliament which convened in 1628 to assent to the Petition of Right (See PETITION OF RIGHT), he assembled no Parliament for eleven years after that time and ruled almost as arbitrarily as Louis XIV of France (See CHARLES I). The persecutions of the Puritans, the attempt to force the Anglican liturgy on the Scottish church and the continued disregard of the necessity of calling a Parliament finally brought matters to a head, and when, in 1640, Charles did assemble a Parliament, because he found that he must have its aid in putting down the risings in Scotland,



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Parliament took matters into its own hands and impeached the king's ministers. The contest soon led to open war. After several years of varying fortunes the war ended in the defeat of Charles, who gave himself up to the Scottish army. He was handed over to the English Parliament and in 1649 was tried, convicted of treason and put to death. The strongest man in Parliament and in the army, Oliver Cromwell, soon showed himself the natural head of the country, and he was able by 1653 to make himself lord protector of the commonwealth and to rule almost absolutely until his death in 1658. Cromwell's son proved but a weak successor, and by 1660 the royalists were able to bring about the restoration of Charles II, who was most enthusiastically greeted on his return to England (See CHARLES II). This reign (1660-1685), during which in its foreign policy England was little more than a dependency of France, during which the court and society were more licentious than at any other period of English history, passed without any serious protests against the arbitrary character of Charles, so glad were the people to have again a king of the royal line.

Before the death of Charles, attempts were made to exclude from the succession his brother, James, because he had adopted the Catholic religion, but these proved unsuccessful, and James succeeded to the throne without a struggle. The pronounced favor which he showed to Catholics, his setting aside of the Test Act, his proclamation of a declaration of indulgence and, finally, the birth, in 1688, of a son who, it was feared, might be trained in the Catholic religion and might continue his father's policy, led many of the great nobles of the country to dispatch an invitation to William and Mary, the son-in-law and daughter of James, to accept the English throne. On their landing, late in 1688, James fled, and William and Mary were proclaimed sovereigns without striking a blow (See JAMES II; WILLIAM III).

During William's reign the Dissenters were allowed freedom of worship, and a step was taken in the direction of true constitutional government, by the declaration of the responsibility of the king's ministers to Parliament. In foreign affairs the reign was taken up largely with the struggle with Louis XIV of France, and William died just when he had begun preparations for another struggle with Louis. Anne (1702-1714) continued his plans, and her reign was made brilliant by the successes of

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Marlborough in the War of the Spanish Succession (See ANNE; MARLBOROUGH; SUCCESSION WARS, subhead *War of the Spanish Succession*). It was during this reign, in the year 1707, that the legislative union of England with Scotland was finally accomplished. For the further history, see GREAT BRITAIN, subhead *History*. Consult Burroughs's *Fresh Fields*; Knox's *Boy Travellers in Great Britain and Ireland*, and Butterworth's *Zigzag Journeys in the British Isles*.

**England, CHURCH OF**, the name of the State Church of England. The term is used in two senses. The first in a general way refers to the church as a whole, which since the introduction of Christianity has been the church of the English people. In a broader sense, it refers to the Church of England as distinguished from the Roman Catholic Church, and it is in this sense that the term is ordinarily used. The present Church of England really dates from the reign of Henry VIII, who, by divorcing Catharine of Aragon without the consent of the pope, brought on the struggle which resulted in the abolition of papal authority in England and the complete independence of the Church of that country. Henry was made the supreme head of the Church and at the time contemplated no change in doctrines and no separation into rival communities. However, the king dissolved the monasteries and expended the treasures of the Church on himself and court. These high-handed measures retarded any reform movement that might have been made and caused a general discontent, not only among the officials but among the communicants of the Church. During the reign of Edward VI the influence of the Reformation was strongly felt in England, and there were many men who sympathized with Luther, Calvin and other leaders of that movement; England probably would have become Protestant at that time had not the king been succeeded by Mary, who was a Catholic. During her reign there was a strong reaction. This struggle continued during the reign of Elizabeth, though she exerted her influence for the ancient Church of the land. In 1562 the convocation and parliament at London subscribed to the Thirty-Nine Articles (See ARTICLES, THE THIRTY-NINE), which have ever since been the authoritative teaching, and with the Book of Common Prayer constitute the orthodox doctrines of the Church of England. During Elizabeth's reign, Puritanism sprang up (See PURITANS) and though strongly opposed by Elizabeth and her successor, James I, continued to spread. In 1580 the

Puritans separated from the Church and formed an independent organization. This led to violent persecution as well as civil oppressions, which in 1653 resulted in the overthrow of the king, and from that time till 1660 the Church of England was practically suspended. However, with the restoration of the monarchy and the accession of Charles II, the Church was restored to its original position, from which it has never since been removed, though at different times its influence has been weak and its condition somewhat perilous.

The Church is now divided into two branches, generally known as the *high church* and *low church*. The high church claims to be the representative of the Catholic, or national, school, which was prominent in Elizabeth's time. They believe in the efficacy of the sacrament, in apostolic succession and in the authority of the Church and priesthood (See APOSTOLIC SUCCESSION). The low church represents the Protestant, or Puritan, part of the Church during Elizabeth's reign. They do not believe in the efficacy of the sacrament and deny that regeneration necessarily takes place in infant baptism.

The ecclesiastical law of England is very simple. There is no formal constitution, but the Church is governed by about 150 canons. Parliament with the sovereign may impose any law on the Church. Convocations are called for the purpose of considering ecclesiastical subjects. The country is divided into two provinces, Canterbury and York, with an archbishop in each, the archbishop of Canterbury being the primate of all England. Each province is divided into dioceses, over which are bishops. Next to the bishops in order of rank are the archdeacons and deans, followed by canons, prebendaries, rectors, vicars and curates. Many of the churches have large endowments, and the support of their clergy is entirely independent of the congregation. The Church maintains effective missionary societies and other auxiliary organizations and has missions in almost every part of the world where Christianity does not prevail. See EPISCOPAL CHURCH.

**Englewood**, *in'g'l wood*, N. J., a city in Bergen co., about 14 mi. n. by e. of Jersey City, on the Erie railroad. It is a residence place near the Hudson River, on the western slopes of the Palisades. There are summer homes for working girls, a hospital and a library association, but no manufactures. The village was incorporated in 1860, and the city was chartered in 1896. Population in 1910, 9924.

**Eng'lish**, WILLIAM HAYDEN (1822-1896), an American politician, born at Lexington, Ind. In 1843 he became clerk of the lower house of the Indiana legislature. From 1853 to 1861 he was a democratic member of the national House of Representatives, and for the same time he was a regent of the Smithsonian Institution. In 1880 he was unanimously nominated for vice-president by the Democratic convention.

**English Channel**, the arm of sea which separates England from France, extending, on the English side, from Dover to the Land's End, and on the French, from Calais to the Island of Ushant. It is 20 miles wide at its narrowest point and 140 miles at its widest point. The Seine is the only important river that flows into it. In this channel are the Isle of Wight and the group of the Channel Islands. The chief ports are Plymouth, Falmouth, Southampton, Portsmouth, Brighton and Dover, in England, and Cherbourg, Havre, Dieppe, Boulogne and Calais, in France.

**English Language**, the language spoken by the people dwelling in England and the United States and in their possessions and colonies. The foundation of this language is the speech of the ancient Angles and Saxons, who separated themselves from their Teutonic brothers in the north of Europe and crossed to England in the fifth and sixth centuries A. D. They found here the Britons, speaking a Celtic dialect; and though, after one hundred fifty years of hard and incessant fighting, they succeeded in driving the natives to the north and west, that ancient language has persisted to this day among the Welsh, and our own language owes to it a number of words. The highly inflected Anglo-Saxon language was little modified until the Norman Conquest, when the proud conquerors made French the language of the court and of law. The English people would not accept this new speech, and for two hundred years two languages with many dialects were spoken in this little island. About 1250 there began the amalgamation of these two tongues, together with the dropping of the complicated inflections. In less than two hundred years this new language had come into the schools and could be heard in the pleadings at law; our modern English language had been pretty well established. Of this new composite language, the Anglo-Saxon had furnished the common words of the home, the farm and every-day life; while the Norman had introduced the words that pertained to the court, society, sports and law. Under the



Italian influence, which lasted from 1400 to 1660, many more words of Latin origin were incorporated into our speech; and the recent developments in science have brought a large influx of technical terms, generally derived from the Latin and the Greek. So in thirteen or fourteen centuries an Anglo-Saxon vocabulary of possibly 30,000 words has expanded into the rich and full English language of over 200,000 words, of which a large majority have been adopted from foreign tongues. Yet the grammar of our language and the vocabulary of our common speech are in the main still the vigorous Anglo-Saxon. See PHILOLOGY; LITERATURE, subhead *English Literature*; GRAMMAR; LANGUAGE, METHODS OF TEACHING.

**English Literature.** See LITERATURE, subhead *English Literature*.

**English Universities.** See UNIVERSITY, subhead *English Universities*.

**Engra'ving**, the art of cutting characters or figures of any sort on wood, stone or metals. Undoubtedly the earliest uses of engraving were for ornament. From this the process of printing from engraved blocks was discovered. The earliest engraving for the purpose of printing consisted in cutting the figures in relief upon blocks of wood, and this art originated with the Chinese, who, as early as the tenth century, were engaged in printing from wooden blocks. The art of printing from engraved plates of metal was discovered by an Italian in the fifteenth century, and by the middle of that century it was quite common in most of the countries of Europe. Some of the most celebrated artists of the fifteenth and sixteenth centuries were engaged in the reproduction of their works by the use of engraved plates. In the latter part of the seventeenth century the art was introduced into England, and from that country it extended to the American colonies.

Previous to the discovery of the art of photography, engraving was about the only means of reproducing portraits or the works of artists; but except for special purposes, such as the printing of bank notes and some very high classes of pictures, the art has now been almost entirely superseded by halftone printing and zinc etching. See HALFTONE; ZINC ETCHING.

**LINE ENGRAVING**, as implied by the term, is executed entirely in lines. The tools are few and simple. They consist of the graver, or *burin*, the point, the scraper and the burnisher; an oil stone or hone, dividers, a parallel square, a magnifying lens; a bridge on which to rest the hand;

a blind or shade of tissue paper, to make the light fall equally on the plate, callipers for leveling important erasures, a small steel anvil, a small pointed hammer and punches. In etching, the following articles are required: a resinous mixture, called etching ground, capable, when spread very thinly over the plate, of resisting the action of the acids used; a dauber, for laying the ground equally; a hand vice; some hair pencils of different sizes, and bordering wax, made of burgundy-pitch, beeswax and a little oil.

In engraving, the plate, which is highly polished and must be free from all scratches, is first prepared by spreading over it a thin layer of *ground*. The surface is then smoked, and the outline of the picture is transferred to it by pressure from the paper on which it has been drawn in fine outlines by a black lead pencil. The picture is then drawn on the ground with the etching needle, which removes the ground in every form produced by it and leaves the bright metal exposed. A bank of wax is then put round the plate, and dilute acid is poured on it. This eats out the metal along the lines from which the ground has been removed, but leaves the rest of the plate untouched. The plate is then gone over with the graver, the etched lines are clearly defined, broken lines are connected, new lines are added and other necessary corrections are made. Sometimes the plate is *rebitten* more than once, those parts which are sufficiently bitten in the first treatment being *stopped* with varnish, and only the selected parts exposed to after-biting. Finally, the burnisher is brought into play alternately with the graver and point, to give perfectness and finish. Such is the process for landscape engraving. In historical and portrait engraving of the highest class, the lines are first drawn on the metal with a fine point and are then cut in by the graver, the artist first making a fine line and afterward entering and re-entering till the desired width and depth of lines is attained. Much of the excellence of such engravings depends on the mode in which the lines are laid, their relative thickness and the manner in which they cross one another.

**SOFT-GROUND ETCHING.** The ground, made by mixing lard with common etching ground, is laid on the plate and smoked as before, but its extreme softness renders it liable to injury. The outline of the subject is drawn on a piece of rough paper larger than the plate. The paper is then damped, and laid gently over the ground, face upward, and the margins are folded over

## Engraving

and pasted down on the back of the plate. When the paper is dry and tightly stretched the bridge is laid across, and with a hard pencil and firm pressure the drawing is completed in the usual manner. The pressure makes the ground adhere to the back of the paper at all parts touched by the pencil, and on the paper being lifted off, these parts of the ground are lifted with it, and the corresponding parts of the plate thus left bare are exposed to the subsequent action of the acid. The granulated surface of the paper, causing similar granulations in the touches on the ground, gives the character of a chalk drawing. The biting-in is effected in the same manner as already described, and the subject is finished by rebiting and dotting with the graver.

**WOOD ENGRAVING.** Wood engravings are made on Turkish boxwood. The wood is cut across the grain, one side of the slab is polished and finished, and wherever there are imperfections in the wood a hole is bored and a plug of wood is neatly inlaid. A block of the required size is sawed from the slab and prepared for the artist. If the artist is to draw the design or picture to be engraved on the block, the engraver scours the face of the block with pumice stone and a little water. When the wood is bright enough, the water is dried off, and a little flake white is rubbed over the surface. This gives a drawing surface. The artist then sketches the design and turns the block over to the engraver. However, the object which is to be reproduced by the wood engraver is usually photographed on the face of the block. A reverse negative is obtained, and the face of the wood is coated with gelatin and treated with a mixture of zinc white and acids. The surface is then sensitized with nitrate of silver in a "dark room." The negative is clamped to the block, film side next to the wood, and a photographic print is made in the usual manner. See HALFTONE.

The wood engraver's tools are delicate and are made of the finest steel. They are called gravers. These include tint tools, which are used for cutting mechanical or perfectly straight parallel lines; lozenge tools, used for cutting artistic or curved lines; elliptical tools and gouges. If a slip of the knife is made, a hole is bored in the block where the tool slipped, and a plug of wood is inserted. Before the engraver begins cutting out the design, he gums a piece of paper over the sketch or photograph and tears out a hole over that part of the work where he begins engraving. The paper keeps the hand

## Entablature

and fingers from smudging the drawing, and as the work progresses he enlarges the hole. After the job is finished a proof is taken under a hand press, and if it is satisfactory the woodcut is sent to the electrotyper, as the printing is not done from the woodcut, but from electrotypes of it. See AQUATINT; ETCHING; MEZZOTINT.

**En'id**, OKLA., the county-seat of Garfield co., 60 mi. n. w. of Guthrie, on the Denver, Enid & Gulf railroad and on several lines each of the Frisco and the Chicago, Rock Island & Pacific systems. The city is located in a fertile farming country, especially productive of wheat. There are excellent shipping facilities, and the many wholesale houses conduct an extensive trade. There are large flour mills, railroad shops, a brick plant, and broom, ice, yeast, artificial stone, candy and other factories. The courthouse is a fine structure, while the hotels and business blocks are mostly substantial brick buildings. The Oklahoma Christian University is here. The city dates from the opening of the Cherokee strip in 1893, and has grown rapidly. Population in 1910, 13,799.

**En'nius**, QUINTUS (239-169 B. C.), an early Latin poet, considered by the Romans as the father of their literature. Only fragments of his work remain, but these show that he must have been a writer of much vigor and energy.

**Enoch**, *e'nok*, BOOK OF, an apocryphal book of an assumedly prophetic character. Considerable importance has been attached to it on account of the supposed quotation from it by Saint Jude in the fourteenth and fifteenth verses of his epistle. It is referred to by many of the early fathers. Its date and authorship are uncertain.

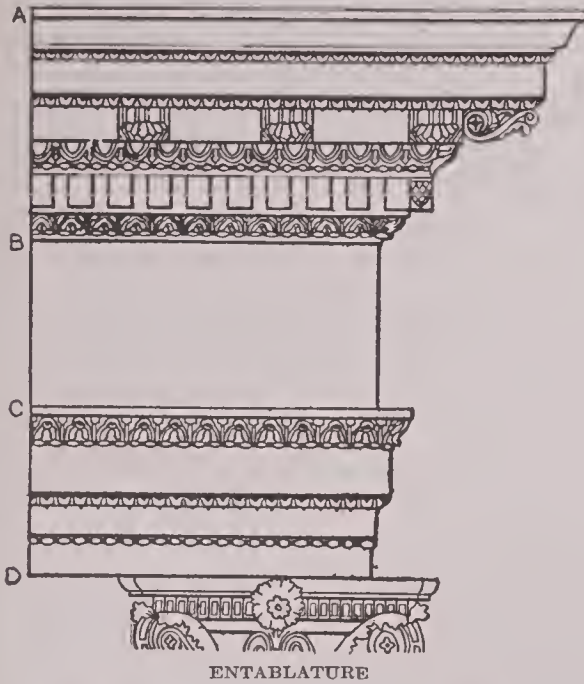
**Ensilage**, *en'si layj*, a food or fodder for stock. Any forage plant, usually corn that has grown so near to maturity that it is glazed, is cut, chopped up and packed into a pit, or silo, where by the exclusion of the air it is kept green and nutritious. Silos of the best form are circular and partially underground, built of stone or grout and so constructed that they can be closed air-tight. In this form the silo is emptied from the top or side. Ensilage was introduced into the United States from France about 1875 and now is used to a greater extent here than in Europe. It is of great value on dairy farms, as it furnishes a sweet, juicy fodder during the winter.

**Entab'lature**, in architecture, the top of a structure; also the part immediately below the roof. Strictly speaking, the term is used in classic architecture to denote the horizontal por-



## Entail

tion of a building which rests upon a row of columns. It consists of three principal divisions, the *architrave*, the portion immediately above the column; the *frieze*, the central space, and the



AB, cornice; BC, frieze; CD, architrave.

*cornice*, the upper projecting moldings. In large buildings, projections similar to and known also as entablatures are often carried round the whole edifice, or along one front of it. See COLUMN.

**Entail'**, in law, the settlement of an estate by which the title to land descends to a person and the heirs of his body, either to all or to special ones, in exclusion of others, with such particular restrictions as the donor may specify. Such a grant forbids the alienation, or sale, of the land, and it thus establishes an hereditary property. Entail has been abolished in most states of the Union. See PRIMOGENITURE.

**Entertaining, SUGGESTIONS FOR.** "What shall I do to entertain my guests?" This question presents itself frequently to large numbers of people; therefore, the following outlines ought to prove timely and helpful. These suggestions are of a varied nature; there is material for those whose guests enjoy competition in mental alertness, and for those whose guests prefer physical relaxation. A good many of the games can be modified, if it seems advisable, to adapt them particularly to individual needs.

**REVEALING ANSWERS.** One of the players goes out of the room and those remaining select the name of a well-known song. The person who is to guess this name is then called in and is told to ask the various players certain questions. Each answer must contain some word

## Entertaining

in the first line or the first stanza of the song. (This point depends upon the number of players, the length of the lines, and the preference of the players as to how difficult the game is to be made.) For example, suppose the song "Old Oaken Bucket" is selected. The answers must contain the words *heart*, *scenes*, *childhood*, etc.

**REVEALING SYLLABLES.** This is a variant of the preceding game. Each of the players is given one syllable out of a specified line, which he must sing to a selected tune. The syllables are all sung at the same time, and the one guessing the song must endeavor to distinguish them and to piece them together. If *America* is chosen, the players will all be singing together, but one will sing only *my*, another *coun*, another *try*, etc. The syllables may be sung in regular rotation, or otherwise, as the players prefer.

**DESCRIPTIVE INITIALS.** Each of the following expressions suggests the name of an individual prominent within recent years. The initial letters of the words in any description are the initials of the person described. The hostess may write the descriptions on cards and pin one on each guest. The guests are then provided with slips of paper, and pencils, and directed to write down the names as they guess them. Have the cards numbered.

DESCRIPTION	KEY
1. Whales John Barleycorn	William Jennings Bryan
2. Found Cheating.....	Frederick Cook
3. Thoroughly Energetic.....	Thomas Edison
4. Made Fortunes.....	Marshall Field
5. Handles Flivvers.....	Henry Ford
6. Doesn't Love Germany.	David Lloyd George
7. Evoked Pandemonium.	Emmeline Pankhurst
8. Reached Pole.....	Robert Peary
9. Movie Princess.....	Mary Pickford
10. Justly Promoted.....	John Pershing
11. Nationally Rejected.....	Nicholas Romanoff
12. Thundering Reformer...	Theodore Roosevelt
13. Greatest British Satirist	George Bernard Shaw
14. Explored Southward.....	Ernest Shackleton
15. Belabors Satan.....	"Billy" Sunday

**WRITE A TELEGRAM.** This game calls for a number of telegraph blanks, if they can be obtained; of course, an ingenious hostess can easily make imitation ones. Each blank has written on it ten letters, and each player is directed to compose a telegram using words beginning with the letters. A prize may be given for the most original. For example, the

person having the letters B S F S C T O R A H might write: "Burglars stole father's shoes; catch train or ride a horse."

ACTING CHARADES. Competing sides are chosen and each side in turn acts out for the opponent a word of several syllables. The side which guesses the most words is declared the winner. For instance, if *mantel-piece* be chosen the first two syllables may be represented by someone who tells a story about a man. *Piece* can easily be acted out, and lastly the entire word. There are a large number of words that lend themselves to portrayal of this sort, and charades are excellent material for sharpening the wits. Some suggested words follow: Windlass, necromancer, children, Washington, silent, mistletoe, mendicant, handicap, inspiration, instrumental, laundress.

The charades which follow may be read aloud or be written on slips of paper and passed around to be guessed. They are not acting charades, as may be seen. Puzzles of this sort may be used to good advantage at a luncheon, before the guests leave the table.

HIDDEN NAMES OF FLOWERS. Each of the following may be written on sheets of paper or, better, may be typewritten and passed to the guests for solution:

1. My first and second are each a lady's name,  
My third an exclamation.  
My fourth is a part of the human frame,  
My whole a spring donation.
2. My first plus my second's a gift from the Lord,  
And comes every day with the light.  
My third plus my fourth is the victor's reward.  
My whole goes to sleep every night.
3. My first enjoys the morning sun  
And trills a song on high.  
My second makes the horses run,  
My whole is like the sky.
4. My first two form a lady's name,  
Borne by queens well known to fame.  
My third describes a metal rare,  
Adorning many a lady fair.  
My whole, a flower of yellow hue,  
Opens its eyes in morning's dew.
5. In days of old my first came forth,  
And preached on Jordan's shore.  
In later days my last was used,  
But now is used no more.  
You'll find my whole a jolly fellow,  
Dressed in a coat of brightest yellow.

KEY.

- |                  |             |            |
|------------------|-------------|------------|
| 1. Anemone       | 3. Larkspur | 5. Jonquil |
| 2. Morning glory | 4. Marigold |            |

THE MINISTER'S CAT. A certain letter of the alphabet is selected and each player must think of an adjective beginning with that letter, to apply to the minister's cat. The players describe the animal in rotation, as follows: The minister's cat is a *little* cat; a *laughing* cat; a *lean* cat, etc. No word may be used more than once, and the winner is the one who can stay in the game longest, thus disclosing ability to name the greatest number of adjectives.

GEOGRAPHICAL GAME. The person starting the game uses a sentence containing some geographical word, as "I live in America." The next player must use a sentence containing a term beginning with the last letter in *America*, as "I crossed the Atlantic." The third player gives a sentence containing a word beginning with "C," and so on. No geographical term may be repeated, and those who make mistakes or cannot think of a term drop out of the game.

JOHN BROWN'S BODY. This is a nonsense game that is sure to create much laughter. The players sing in unison the chorus "John Brown's body lies a mould'ring in the grave." The first time they sing the four lines entire. The second time they sing all but the first word, *John*; instead of singing that word they nod the head. The next time they give two nods and begin with the word *body* and so on through the song.

OLD MRS. MCKINSEY IS DEAD. This is another nonsense game. The first player says to his right-hand neighbor, "Old Mrs. McKinsey is dead." "How did she die?" asks the second player. "This way," and player number one waves his right hand back and forth. The answer and question go round the circle, and each player keeps his hand waving. Then number one begins again, and when asked how the old lady died, waves his left hand. This also goes round the circle. The third time the leader nods his head, the fourth time he shakes a foot, and so on. The game can be kept up as long as the players wish. After a number of rounds the players usually have to stop because they are exhausted with laughter.

ELEMENTARY ELOCUTION. Each of the players is given a slip with the name of a Mother Goose jingle written on it. As their names are called each player mounts a chair and delivers, as dramatically as possible, the rhyme assigned him. This affords good opportunity for mock heroics and plenty of fun. Prizes may be given for cleverness of interpretation. A variant of this idea is to have familiar songs, especially comic ones, sung in grand opera style.



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**ACTED MUSIC.** Those who possess phonographs can entertain their guests in a somewhat unusual way by having various selections acted out. Certain persons must be chosen beforehand and drilled. For example, someone may dress up as a grand opera *prima donna* and go through all the motions of singing while the phonograph is rendering the aria. Sousa's marches may be conducted by a person imitating the "March King." There are many other stars who can be represented.

**A DRESS-UP AFFAIR.** This is a contest in getting into and out of garments quickly. Each of the guests brings with her a suitcase filled with a specified number of nondescript garments. The cases are passed around later, so that no one may know what the one given to her contains. At a given signal the cases are opened, and each player puts on, exactly in the order in which she touches them, the garments in the case. As soon as she has used them all she must take them off again, pack them in her suitcase, and close it. The one who finishes first is the winner. The ridiculous appearance of the players gives an added element of fun.

**WHO AM I?** This is an excellent game to play when there is a large number of guests and the hostess wishes them to get acquainted with one another. A slip bearing the name of a noted person is pinned on the back of each guest, and as the guests circulate about they ask one another "Who am I?" The answers may suggest the names on the slips, but must not inform the questioners outright.

**MISCELLANEOUS GUESSING CONTESTS.** A number of contests follow which will test the ingenuity of the players. The hostess in most cases should write out the exercises on slips of paper and have the guests write the answers. Prizes may be given for accuracy and originality.

**A Missing Song Romance.** Write out the following questions and leave blank spaces for the answers. As each question is read someone at the piano plays a strain of the song to be guessed. The title of the song in each case is the answer to the question.

1. What was the hero's name? *Ben Bolt.*
2. What was his sweetheart's name? *Annie Laurie.*
3. What made him become a soldier? *The Battle Cry of Freedom.*
4. For what did he offer his life? *America and Home Sweet Home.*
5. When did he come to say goodbye? *In the Gloaming.*

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6. Who opened the door for him? *Old Black Joe.*
7. What did the heroine offer the hero? *The Vacant Chair.*
8. What did he bring her? *Flowers That Bloom in the Spring.*
9. How did her voice sound as she thanked him? *Sweet and Low.*
10. What did he say to her? *How Can I Leave Thee?*
11. What did she promise to do? *Keep the Home Fires Burning.*
12. What were her last words to him? *"Good By, My Lover, Good By."*
13. What kind of a watch did he promise to seek? *Watch on the Rhine.*
14. Where was he in a few weeks? *Tenting on the Old Camp Ground.*
15. When did he think of her? *Oft in the Stillly Night.*
16. What did he say when they asked him whom he was thinking about? *The Girl I Left Behind Me and Old Folks at Home.*
17. What did he sometimes sing? *Love's Old Sweet Song.*
18. What appeared on her head as she waited at home? *Silver Threads Among the Gold.*
19. What always floated over her home? *The Star-Spangled Banner.*
20. What was the motto of both? *The Stars and Stripes Forever!*

**A Bouquet of Well-known Flowers.** When Jack was a small boy his mother decided to educate him for the ministry, because, so she said, she wanted to see . . 1 . . some day. She was very strict with him, and when he was disobedient she punished him with a . . 2 . . That used to make him . . 3 . . Jack called his father . . 4 . . and his good-natured brother Bill he nicknamed . . 5 . . His sister Sue he called . . 6 . . because she had such dark eyes. Jack's mother told him that if he wanted his health to be . . 7 . . he must get up at . . 8 . . in the morning. So when his father called . . 9 . . he always . . 10 . . at once. As Jack grew up his mother thought he ought to find him a wife. She said, "I hope you will not . . 11 . . ; I would rather see you . . 12 . . in . . 13 . . with a poor girl."

One day Jack met a pretty maid named Rose, whom he loved at first sight. So he . . 14 . . to marry him. He said ". . 15 . . me. I lay my . . 16 . . at your feet." But she was a . . 17 . . and she replied ". . 18 . ." But after he had asked her many a . . 19 . . she finally consented to be his . . 20 . . That evening in her parlor

## Entertaining

they drew down the ..21.. and he kissed her ..22.. When he went home each said to the other “..23..” They were soon married, and she urged him not to become a mere ..24.. of society. Some people ..25.. anything, but he remembered her words, and though he met many foreign belles he remained true to his ..26...

### KEY

- |                       |                    |                     |
|-----------------------|--------------------|---------------------|
| 1. Jack-in-the-pulpit | 9. Johnny-jump-up  | 18. Touch-me-not    |
| 2. Lady's slipper     | 10. Rose           | 19. Thyme           |
| 3. Balsam             | 11. Marigold       | 20. Heartsease      |
| 4. Poppy              | 12. Liveforever    | 21. Nightshades     |
| 5. Sweet William      | 13. Sweet peas     | 22. Tulips          |
| 6. Black-eyed Susan   | 14. Aster          | 23. Forget-me-not   |
| 7. Everlasting        | 15. Rosemary       | 24. Dandelion       |
| 8. Four o'clock       | 16. Bleeding heart | 25. Lilac           |
|                       | 17. Primrose       | 26. American Beauty |

*Hidden Names of Birds.* My son Bill came into the house one day looking very angry and so out of breath that he was ..1.. “Why are you so ..2..?” I said. “..3.. rather see you happy.” “Well,” said Bill, “I was out by the brook sitting on a ..4.. and along came Ern Jones. ‘Do your ..5..,’ I said, ‘and let’s catch some fish.’ So we sat down together, and after awhile we began to ..6... But I ..7.. if he didn’t try to ..8.. all over me, telling me he was the ..9.. of the neighborhood, and it was a ..10.. to beat anyone. Now, I couldn’t ..11.. all of his ..12.. and I told him he was ..13.. me of my just deserts. Ern is a ..14.. fellow and before I could ..15.. or ..16.. my head, he hit me. So we had a fight and here I am.” When I had heard Bill’s story I scratched my ..17.. for I have little ..18.. my head, and decided not to ..19.. for fighting. If a boy treated me that way I ..20.. him into the brook.

### KEY

- |              |               |                    |
|--------------|---------------|--------------------|
| 1. Puffin    | 8. Crow       | 15. Tern           |
| 2. Crossbill | 9. Kingfisher | 16. Duck           |
| 3. Eider     | 10. Lark      | 17. Baldpate       |
| 4. Rail      | 11. Swallow   | 18. Heron          |
| 5. Bittern   | 12. Raven     | 19. Whip-poor-will |
| 6. Chat      | 13. Robin     | 20. Wood-duck      |
| 7. Swan      | 14. Swift     |                    |

*State Guessing Contest.* In the following exercise the answer to each question is the abbreviation of one of the states of the Union:

- What state has never married?
- What state needs a physician?
- What is the degree of that physician?
- What state is useful in haying time?
- What state is very exclamatory?
- What state is busy on Mondays?
- What state has a shelter in time of rain?
- What state is dear to the Mohammedans?
- What state can never be you?
- What state is very pious?
- What state never says “can’t”?

## Entertaining

- What state uses the decimal system?
- What state sells gold bricks?
- What state could go out rowing?
- What state is daddy to them all?

### KEY

- |          |           |           |
|----------|-----------|-----------|
| 1. Miss. | 6. Wash.  | 11. Kan.  |
| 2. Ill.  | 7. Ark.   | 12. Tenn. |
| 3. Md.   | 8. Ala.   | 13. Conn. |
| 4. Mo.   | 9. Me.    | 14. Ore.  |
| 5. O.    | 10. Mass. | 15. Pa.   |

*A Catechism on Authors.* In each case the author’s last name suggests the attribute applied to him:-

- What author is the most helpful?
- What author is the best digger?
- What author is the best shoe polisher?
- What author hurts a man the most?
- What author is the most aristocratic servant?
- What author is the hottest?
- What author is the best barrel maker?
- What author is the sourest?
- What author is the shrewdest?
- What author is the most like our first ancestors?
- What author is the healthiest?
- What author is the most enduring?
- What author is the heartiest?
- What author is the best fisherman?
- What author cries the hardest?
- What author is the meekest?
- What author is the tallest?
- What author is the most foppish?
- What author is the fairest?
- What author is the most uncertain?
- What author is the loudest?
- What author suffers the most?
- What author is the saintliest?
- What author is the most bookish?
- What two authors are farthest apart?
- What author is the most scornful?
- What author is the hardest?
- What author is the strictest?
- What author is most likely to win a race?
- What author sews the best?
- What author has the least repose?

### KEY

- |                          |  |
|--------------------------|--|
| 1. George Ade            | 17. Henry W. Longfellow                  |
| 2. John Burroughs        | 18. Richard Lovelace                     |
| 3. Richard Blackmore     | 19. John Lyly                            |
| 4. John Bunyan           | 20. Hamilton Wright Mabie                |
| 5. Samuel Butler         | 21. Alfred Noyes                         |
| 6. Robert Burns          | 22. Thomas Paine                         |
| 7. James Fenimore Cooper | 23. Alexander Pope                       |
| 8. George Crabbe         | 24. Charles Reade                        |
| 9. John Fox              | 25. Christopher North and Robert Southey |
| 10. Edward Gibbon        | 26. Bernard Shaw                         |
| 11. Edward E. Hale       | 27. Richard Steele                       |
| 12. Thomas Hardy         | 28. Lawrence Sterne                      |
| 13. Bret Harte           | 29. Jonathan Swift                       |
| 14. Thomas Hooker        | 30. Bayard Taylor                        |
| 15. William Dean Howells | 31. Oscar Wilde                          |
| 16. Charles Lamb         |  |



## Entertaining

*Hidden Names of Authors.* In each instance the name of the author is suggested in the text.

1. The places we should like best of all to be.
2. A precious metal and a worker in metal.
3. The seat of our affections.
4. The penalty for wearing shoes that pinch.
5. To agitate a weapon.
6. To injure and the opposite of high.
7. The man who takes your measure.
8. The things that languages are made of, and a man's character.
9. A name applied to prohibition advocates, and a refuge for wild beasts.
10. A lizardlike animal and a preposition.
11. A domestic animal and what it cannot do.
12. What the bread is doing in the oven.
13. A fuel and something under which it is often found.
14. A vehicle and a popular kind of hosiery.
15. The opposite of an old fellow.
16. What a boy asks for when he gets one piece of candy.

### KEY

- |                |                       |               |
|----------------|-----------------------|---------------|
| 1. Holmes      | 7. Taylor             | 13. Coleridge |
| 2. Goldsmith   | 8. Wordsworth         | 14. Carlyle   |
| 3. Harte       | 9. Dryden             | 15. Newman    |
| 4. Bunyan      | 10. Newton            | 16. More      |
| 5. Shakespeare | 11. Cowper            |               |
| 6. Marlowe     | 12. Browning or Bacon |               |

*See What You Can Do With "X".* In the following exercise, add a word in each case to the prefix "ex," and get a new word (partly phonetic):

1. Add a division of a play and get a synonym for *precise*.
2. Add loose coins and get a form of barter.
3. Add an employe in a restaurant and get the treasury of a state.
4. Add a homesteader's land and get what he does when he sees it.
5. Add a telegram and get an edict of punishment from the Pope.
6. Add a small island and get a wanderer.
7. Add a pronoun and get a way out.
8. Add a few cents and get something that demands more cents.
9. Add a word meaning *impudent* and get a person of skill.
10. Add a coast city and get what is sent out of it.
11. Add a printing machine and get a swift train.
12. Add a camper's shelter and get the limit of that shelter.
13. Add nervous strain and get an addition.
14. Add the end of anything and get its destruction.
15. Add a self-propelled farm implement and get a man that pulls teeth.

## Entertaining

16. Add a story of legendary fame and get the fate of many criminals.

### KEY

- |                    |             |                   |
|--------------------|-------------|-------------------|
| 1. Exact           | 6. Exile    | 12. Extent        |
| 2. Exchange        | 7. Exit     | 13. Extension     |
| 3. Exchequer       | 8. Expense  | 14. Extermination |
| 4. Exclaim         | 9. Expert   | 15. Extractor     |
| 5. Excommunication | 10. Export  | 16. Extradition   |
|                    | 11. Express |                   |

*Who Are These Kates?* The answer in each case is a word ending in *cate*.

1. A Kate who will plead for you.
2. A Kate who embezzles.
3. A Kate who is often sick.
4. A Kate who sometimes puts her shoulder out of joint.
5. A Kate who has a double.
6. A Kate who knows how to teach.
7. A Kate who takes out stains.
8. A Kate who will help you out of difficulties.
9. A Kate who tells falsehoods.
10. A Kate who calls down Heaven's wrath upon you.
11. A Kate whose actions are very puzzling.
12. A Kate who prays with fervor.
13. A Kate who pours oil on squeaky hinges.
14. A Kate who chews her food well.
15. A Kate who makes predictions.
16. A Kate who was smothered.
17. A Kate who points out.
18. A Kate who left the premises.

### KEY

- |              |                               |                   |
|--------------|-------------------------------|-------------------|
| 1. Advocate  | 8. Extricate                  | 13. Lubricate     |
| 2. Defalcate | 9. Fabricate (or Prevaricate) | 14. Masticate     |
| 3. Delicate  | 10. Imprecate                 | 15. Prognosticate |
| 4. Dislocate | 11. Intricate                 | 16. Suffocate     |
| 5. Duplicate | 12. Supplicate                | 17. Indicate      |
| 6. Educate   |                               | 18. Vacate        |
| 7. Eradicate |                               |                   |

*Naming the Nations.* The answer in each case is a word ending in *nation*.

1. The nation that adopts one of two courses.
2. The nation that kills its public men.
3. The nation in which the different parties unite.
4. The nation that crowns its rulers.
5. The nation that is blessed with magic insight.
6. The nation that contributes gifts.
7. The nation that makes things clear.
8. The nation that chooses candidates for office.
9. The nation that installs clergymen.
10. The nation that is bankrupt.
11. The nation that is sluggish.
12. The nation that has no smallpox.

### KEY.

- |                  |                |                 |
|------------------|----------------|-----------------|
| 1. Alternation   | 5. Divination  | 9. Ordination   |
| 2. Assassination | 6. Donation    | 10. Ruination   |
| 3. Combination   | 7. Explanation | 11. Stagnation  |
| 4. Coronation    | 8. Nomination  | 12. Vaccination |

## Entertaining

*Musical Mathematics.* Subtract the last three letters from the names of well-known singers or composers and have left:

1. A vehicle.
2. An inhabitant of Heaven.
3. The opposite of near.
4. That which a river does.
5. That which a traveler does.
6. A pronoun applied to oneself.
7. A pronoun applied to all of us.
8. What an old-fashioned doctor uses.
9. What scandal does to one's reputation.
10. What a gossip's tongue does.

### KEY

- |               |             |              |
|---------------|-------------|--------------|
| 1. Car-uso    | 5. Gad-ski  | 9. Sulli-van |
| 2. Cherub-ini | 6. Me-lba   | 10. Wag-ner  |
| 3. Far-rar    | 7. We-ber   |              |
| 4. Flo-tow    | 8. Herb-ert |              |

Subtract the first letter from familiar musical terms and have left:

1. A sweet-toned musical instrument.
2. A vast mob of soldiers.
3. An athletic contest.
4. An ancient vase.
5. A slang word for money.
6. A four-legged animal.
7. A strong liquor used by sailors.
8. The inmost part of an apple.
9. A skin irritation.
10. A swift means of traveling.
11. A source of water.
12. A small brook.
13. The opposite of new.
14. A child's toy.

### KEY

- |           |             |            |
|-----------|-------------|------------|
| 1. S-harp | 6. B-ass    | 11. S-well |
| 2. C-hord | 7. D-rum    | 12. T-rill |
| 3. B-race | 8. S-core   | 13. H-old  |
| 4. T-urn  | 9. P-itch   | 14. S-top  |
| 5. S-cale | 10. S-train |            |

*Tree Guessing Contest.* In this exercise the answer to each question is the name of a tree. The name in each case is suggested by the question:

1. What tree is a good harbor?
2. What tree is dear to Irish hearts?
3. What tree keeps all dressed up?
4. What tree is wasting away through grief?
5. What tree goes to fortune tellers?
6. What tree can make a horse laugh?
7. What tree can never be myself?
8. What tree is never younger?
9. What tree grows near the seashore?
10. What tree is opposed to prohibition?
11. What tree is feared by unruly boys?

## Entertaining

12. What tree is the least handsome?
13. What tree wears a warm garment?
14. What tree is the father of the others?
15. What tree offers shelter in time of rain?
16. What tree likes to dance?
17. What tree scorns death?
18. What tree would be likely to bark?
19. What tree is the abode of angels?
20. What tree is the most tearful tree?

### KEY

- |                    |                 |                    |
|--------------------|-----------------|--------------------|
| 1. Bay             | 8. Elder        | 15. Umbrella tree  |
| 2. Evergreen       | 9. Beech        | 16. Hop tree       |
| 3. Spruce          | 10. Bottle tree | 17. Live oak       |
| 4. Pine            | 11. Hickory     | 18. Dogwood        |
| 5. Palm            | 12. Plane tree  | 19. Paradise tree  |
| 6. Horse Chest-nut | 13. Fir         | 20. Weeping willow |
| 7. Yew             | 14. Papaw       |                    |

*Adventures of Daffy Dilly.* The blanks in this exercise are to be filled in with names of plants. The hostess should have the answers written on small cards, and give to each guest a set. The test is to make the right selections. The answers, if not arranged in regular order, may be placed where all can see them, if the hostess prefers.

1. Who was Daffy Dilly? He was the son of ..1.. and ..2..
2. Where did he go? He went on a journey to seek a good ..3..
3. What did he say as he started out? Fare-well my ..4...5..
4. What did he wear? ..6.., fastened with ..7..
5. What were on his feet? Pink ..8..
6. What did he carry for a staff? A ..9..
7. What kind of a hat did he wear? A ..10..
8. What emblem was waving in it? The Ameri-can ..11..
9. What money did he carry? A ..12..
10. In what did he keep it? In a ..13..
11. What did he use to count it with? An ..14..
12. What sweets did he take for his lunch? ..15.. and ..16..
13. What did he use for a guide? A ..17..
14. How did he start off? With a ..18..
15. What was his parents' parting admonition? Don't ..19..
16. What was the first strange thing he saw? A cow with a ..20..
17. What did Dilly say? ..21..
18. What next did he see? He saw the ..22.. and break a bone.
19. What did he say then? Can you ..23.. it?



20. Did he offer any assistance? Yes, he asked the cow if she would like to have her ..24..?
21. What did the cow do? She shed ..25.. and became very angry.
22. Did Dilly laugh again? Yes and that made the cow still ..26...
23. What did the cow say then? She said, "Don't be ..27.. at me. I don't like your ..28..."
24. What did Dilly say? He said, "You can't ..29.. me."
25. What happened next? He saw a ..30.. coming down the path.
26. What did he say then? "...31.. part friends, oh Cow, as I must be going."
27. What happened next? He went away in a ..32..ing hurry.
28. What did he do then? He went straight home to his ..33...
29. What did his father say when Dilly told his adventures? He said, "Don't ..34.. that. There is ..35.. as you for sowing ..36... Hereafter you will tend my ..37.. of sheep.
30. What did Dilly say? He said, "All right ..38..."

KEY

- |                        |                      |                 |
|------------------------|----------------------|-----------------|
| 1. Arti Choke          | 12. Pennyroyal       | 24. Boneset     |
| 2. Daisy Flea-bane     | 13. Shepherd's purse | 25. Job's tears |
| 3. Thyme               | 14. Adder's tongue   | 26. Madder      |
| 4. Sage                | 15. Pieplant         | 27. Pecan       |
| 5. Elders              | 16. Candytuft        | 28. Capers      |
| 6. Dutchman's breeches | 17. Compass plant    | 29. Nettle      |
| 7. Bachelor's buttons  | 18. Hop              | 30. Dandelion   |
| 8. Moccasins           | 19. Dodder           | 31. Lettuce     |
| 9. Goldenrod           | 20. Goosefoot        | 32. Tare        |
| 10. A bishop's cap     | 21. Haw haw          | 33. Poppy       |
| 11. Flag               | 22. Cowslip          | 34. Lilac       |
|                        | 23. Beet             | 35. Nonesuch    |
|                        |                      | 36. Wild oats   |
|                        |                      | 37. Phlox       |
|                        |                      | 38. Pawpaw      |

**Entomology**, a branch of zoölogy which treats of insects. See INSECTS.

**En'velope**, the paper cover that encloses a letter or note. Envelopes became common shortly after the introduction of the railroad postal system. At first envelopes were made by hand, but now the work is done wholly by machines, which cut the envelope from the roll of paper, fold and paste it and apply the mucilage to the flap. Some of these machines will manufacture 55,000 envelopes in a day.

**Envi'ronment**, a general term used to indicate all the external conditions which affect the life and activity of an individual. It thus includes everything outside of self and is often-times used in distinction to the term *heredity*, or the influence which descends from parent to

offspring. The environment of an individual is of two kinds, physical and soeial. The first includes the natural conditions of climate; topography; physical laws, such as gravity and those which produce light, darkness and sound, and the nature and extent of food supply. In the early stages of racial development physical environment is nearly all-important, and in view of this fact a certain group of scholars have emphasized the influence of natural economic conditions upon history, to the extent of declaring that this force is the most important of all influences upon the development of a race or nation. In advanecd stages of eivilization the social environment attains greater importanee. By the use of the materials and conditions that nature throws about every race, customs, ideals and institutions are gradually developed, which soon become a determining influence in the life of the individuals of that race. Such are the institutions of family and State, eustoms and ideals of religion and industry. See HEREDITY.

**Eocene**, *e'o seen*, **Epoch**, a division of geologic time, applied to the first part of the Tertiary period. In the United States the formations of this period extend along the Atlantic coast and the Gulf of Mexico, up the Mississippi valley and north of the Ohio. They also occur in some of the ranges of the Rocky Mountains. The rocks include sands, marls, elays, sandstone and limestone. See TERTIARY PERIOD.

**E'pact**, a number assigned to each year, to assist in fixing the dates of the movable church festivals. The epact for any year corresponds to the number of days elapsing between the date of the last new moon of the previous year and the first of January of the year whose epact is sought. The dates of the succeeding new moons are found by adding 29 and 30 alternately, but these dates often differ considerably from those of the actual or astronomical new moons. Having determined the "golden number" (See METONIC CYCLE) of any year between 1900 and 2199, the epact may be easily found in the following table:

GOLDEN NUMBER	EPACT	GOLDEN NUMBER	EPACT
1	29	11	19
2	10	12	30
3	21	13	11
4	2	14	22
5	13	15	3
6	24	16	14
7	5	17	25
8	16	18	6
9	27	19	17
10	8		

## Epaminondas

For the years between 1700 and 1899 the epacts for each golden number except 12 were one more than the number given in the table above; for the golden number 12, the epact was 1. See METONIC CYCLE.

**Epam'inon'das** (418?-362 B. C.), Greek general and statesman, who, for a short time, raised his country, Thebes, to the summit of power and prosperity. He took the leading part in the struggle during which Spartan supremacy in Greece was destroyed and the supremacy of Thebes temporarily secured. Four times he successfully invaded the Peloponnesus at the head of the Thebans.

**Ephemera**, *e fem'e ra*. See MAY FLY.

**Ephesus**, *ef'e sus*, an ancient Greek city of Lydia, in Asia Minor, one of the twelve Ionian cities, on the south side of the Cayster, near its mouth. It was at one time the emporium of western Asia, having a convenient and spacious harbor. During the time of the Roman emperors it was especially prosperous. Some interesting remains of ancient times have recently been discovered by excavation, including those of a magnificent theater, a stadium and a temple of Diana (See DIANA, TEMPLE OF). Several church councils were held here. The site of the city is now desolate; near it is a poor village, Aiasoluk.

**Ephraim**, *e'fra im*, the younger son of Joseph, the founder of one of the twelve tribes of Israel.

**Epic**, a narrative poem. Some authorities restrict the term to narrative poems written in a lofty style and describing the exploits of heroes. Others widen the definition so as to include not only long narrative poems of romantic or supernatural adventure, but also those of a historical, legendary, mock-heroic or humorous character. The epic is distinguished from the drama by the fact that in the epic the author frequently speaks in his own person as narrator; and it is distinguished from lyrical poetry by the predominance of action rather than emotion. Among the more famous epics of the world's literature may be noted Homer's *Iliad* and *Odyssey*, Vergil's *Aeneid*, the German *Nibelungenlied*, the Anglo-Saxon poem of *Beowulf*, the French *Song of Roland*, Dante's *Divina Commedia*, Tasso's *Gerusalemme Liberata*, Ariosto's *Orlando Furioso*, Milton's *Paradise Lost*, Spenser's *Faerie Queene*, Camoëns's *Lusiad* (Portuguese) and Firdausi's *Shah Namah* (Persian). Hesiod's *Theogony*, the poetic *Edda*, the Finnish *Kalevala* and the Indian *Mahabharata* may be described as collections of epic legend; and specimens of the mock-

## Epidemic

heroic and humorous epic are found in *The Battle of the Frogs and Mice*, *Reynard the Fox*, Butler's *Hudibras* and Pope's *Rape of the Lock*.

**Ep'icte'tus** (60-94), a Greek Stoic philosopher, born in Phrygia. He lived long at Rome, where in his youth he was a slave. Though nominally a Stoic, he was not interested in Stoicism as an intellectual system; he adopted its terminology and its moral doctrines, but in his discourses he appeared rather as a moral and religious teacher than as a philosopher. See STOICISM.

**Ep'icure'anism**, a system of philosophy that originated in the latter part of the fourth century B. C. It was founded upon the principle that pleasure is the highest good. Those wishes which can be fulfilled with the least effort or pain were thought to bring the most pleasure; hence the desire for mental enjoyment was to be satisfied, but the cravings for sensuous pleasures which do not lead to a calm mental state were not to be too freely indulged. The Epicureans valued knowledge only as it increased personal enjoyment. They believed that the soul and body died together and had no fears of death, since, while the individual was alive, death was absent, and when death came, the individual was no more. They were bound by allegiance to no particular state or society, but believed in the absolute independence of the individual. The doctrines of Epicureanism were spread throughout Greece and were accepted by many of the prominent Romans. In modern usage the term *Epicurean* is applied to one who seeks pleasure for its own sake.

**Epicu'rus** (342-270 B. C.), a Greek philosopher, founder of the Epicurean school, was born in the island of Samos. He settled at Athens, where he established his school and remained during his life. For his system, see EPICUREANISM.

**Ep'icy'cle**. The old Greek astronomers thought that all the heavenly bodies moved about the earth in circles, while the latter body remained stationary. Soon they discovered that this could not be true of the planets, and to account for the apparent differences they assumed that each planet moved in a small circle of its own, and that the center of this circle moved about the earth. This small circle, the orbit of the planet, was known as the epicycle, and the path through which the center of the epicycle passed was called the *deferent*.

**Ep'idem'ic**, a term applied to certain diseases which appear at intervals in various parts of the



## Epigaea

world and affect a large number of people. All of these diseases have their source in minute bacteria, which are born and developed in decaying animal and vegetable matter or in stagnant pools. The best preventive of these diseases is complete drainage and perfect sanitation. The paving of streets, building of sewers and the filtration of drinking water all are certain preventive measures. The development of serum therapy has already made possible the prevention of many of these diseases, such as smallpox and diphtheria, and it promises to find preventives for most, if not all, of the others.

**Epigaea**, *ep i je'ah*, the name of the mayflower of the United States. See ARBUTUS.

**Ep'igram**, according to the modern meaning of the word, a short poem which, preferably at the end, gives a witty or ingenious turn to the thought. The name is also applied to any concise expression of a general fact. Among the Romans, Catullus and Martial were famous for their epigrams. In English literature, during the Age of Elizabeth, almost every writer of note wrote epigrams, and in a later period Pope especially excelled in this style of writing.

**Ep'ilep'sy** or **Falling Sickness**, a disease of the nervous system, causing unconsciousness, either with or without convulsions. While epilepsy has been known for centuries, it is only within recent years that it has been scientifically studied. The location of the disease is generally considered to be in the gray matter of the brain. It has been cured in rare instances, but usually tends to a general impairment of the mental powers. However, many epileptics live long and useful lives, and the seizures do not increase in frequency and severity as the patient grows older.

There are many varieties of the disease, in some of which there are few outward signs of the attack, and the patient may not know that he has been unconscious. In the ordinary epileptic fit, the person after little or no warning becomes suddenly unconscious and falls, foaming at the mouth. He may have violent convulsions, in which case he should be prevented from doing himself harm in any way. The seizures are often very alarming in appearance, but there is little or no danger, and they will pass away in from ten to twenty minutes, leaving the patient weak for some time. Nothing need be done except to loosen the neckbands and clothing about the chest, to lay the person

## Episcopal Church

down and slightly raise his head. Attempts to force consciousness to return are useless and may be injurious.

**Epiphany**, *e pi'f'a ny*, a festival, otherwise called the *manifestation of Christ to the Gentiles*, observed on January 6 in honor of the adoration of Jesus Christ by the three magi, or wise men, who, led by the star, came to adore him and bring him presents. As a separate festival it dates from 813.

**Epiphytes**, *ep'i fites*. See AIR PLANTS.

**Epi'rus**, a country of ancient Greece, situated in the northwestern part and corresponding to the southern portion of modern Albania. The most interesting locality in it was Dodona. The inhabitants were only in part Greeks. The most celebrated king of Epirus was Pyrrhus, who made war upon the Romans. Epirus became a Roman province in 168 B. C.

**Epis'copal Church** or **Protestant Epis'copal Church**, that branch of the Church in America which became independent of the Church of England in 1789, by adopting a constitution of its own. The prayer book adopted was nearly like the one of the English Church (See ENGLAND, CHURCH OF). Previous to 1811 the church made but little progress. However, during the next ten years such advancement was made that there were churches in thirteen states. Following 1835 churches were established in Minnesota, Iowa, Indiana and Missouri. A division of the church occurred later, owing to difference of opinion concerning the ritual, one branch opposing its outward forms, because they felt that they bore too close a resemblance to the Roman Catholic Church, while the other branch held to the original forms. Those opposing the ritual are known as the *low church* faction, while those advocating it are known as the *high church* party. The latter is now the dominant element in the United States. The church maintains a general conference, which meets every three years and is composed of the house of bishops, including all the bishops having jurisdiction in the United States, and the house of clerical and lay deputies, composed of four clergymen and four laymen from each diocese. Changes in the prayer book or constitution of the church can be made only by this body, and then, only when such changes have been published in every diocese for a period of three years previous to the bringing of the question before the general conference for final action. The church maintains sisterhoods and deaconess orders and has

a powerful auxiliary in the Brotherhood of Saint Andrew.

**Ep'itaph**, an inscription on a tomb or monument in memory of the dead. Epitaphs were in use among the Greeks and Romans, but the Greeks distinguished by epitaphs only their illustrious men, while among the Romans, private names were regularly recorded upon tombstones. The same practice has generally prevailed in Christian countries. Many so-called epitaphs, modern as well as ancient, are merely epigrams or witticisms, not intended to be used upon monuments.

**Ep'ithala'mium**, the name given by the Greeks to a marriage song, usually sung before the chamber of a newly married couple. Among the Greeks Sappho, Anacreon and Pindar produced famous epithalamia, and among the Romans Catullus wrote several which are extant. The poem written by Edmund Spenser on his marriage to Elizabeth Boyle is accounted the finest of English epithalamia.

**Ep'ithe'lium**, in anatomy, the cellular layer which lines the internal cavities and canals of the body, both closed and open, as the mouth, nose, respiratory organs and blood vessels. The term is also applied to the cells of the epidermis, nails and hair and to those that help form glands. There are several varieties of epithelium. See CILIA.

**Epizooty**, *ep'e zo'o ty*, a general name for an infectious disease appearing in short epidemics. In common use, the name is applied to a species of influenza. See INFLUENZA.

**Ep'och** or **E'ra**, a fixed point of time, commonly selected on account of some remarkable event by which it has been distinguished, and which is made the beginning or determining point of a particular year from which all other years, whether preceding or ensuing, are computed. The creation and the birth of Christ are the most important of the historical epochs. The creation has formed the foundation of various chronologies, the chief of which are 1, The epoch adopted by Bossuet, Ussher and other Catholic and Protestant divines, which places the creation in 4004 B. C.; 2, The *Era of Constantinople* (adopted by Russia), which places the creation at 5508 B. C.; 3, The *Era of Antioch*, used till 284 A. D., placed the creation at 5502 B. C.; 4, The *Era of Alexandria* placed it at 5492 B. C. This is also the *Abyssinian Era*; 5, The *Jewish Era*, which places the creation in 3760 B. C. The Greeks computed their time by periods of four years, called

*Olympiads*, from the occurrence every fourth year of the Olympic games. The first Olympiad, being the year in which Coroebus was victor in the Olympic games, was in the year 776 B. C. The Romans dated from the supposed era of the foundation of their city, April 21 in the third year of the sixth Olympiad, or 753 B. C. The *Christian Era*, or mode of computing from the birth of Christ as a starting-point, was first introduced in the sixth century and was generally adopted by the year 1000. This event is believed to have taken place earlier, perhaps by four years, than the accepted date. The Julian epoch, based on the coincidence of the solar, lunar and indictional periods, is fixed at 4713 B. C. and is the only epoch established on an astronomical basis. The *Mohammedan Era*, or *Hegira*, begins on July 16, 622, and the years are computed by lunar months. The Chinese reckon their time by cycles of 60 years.

**Ep'som Salts**, sulphate of magnesium appearing in capillary filars or needle-shaped crystals. It is found native in some mineral springs, but is usually manufactured from magnesian limestone. It is used as a purgative and in the arts. It takes its name from Epsom, England, where it was first procured from mineral waters.

**Ep'worth League**, a religious organization of the young people of the Methodist Episcopal church, organized in 1889. The society, now numbers over 14,000 senior and 7,500 junior chapters and has a membership of more than 600,000, the largest denominational society of young people in the world. The *Epworth Herald*, the official organ, had in 1913 a paid circulation of 100,000.

**Equa'tor**, that great imaginary circle of our globe, every point of which is 90° from the poles. All places which are on it have invariably equal days and nights. Our earth is divided by it into the northern and southern hemispheres. From this circle is reckoned the latitude of places both north and south. There is also a corresponding celestial equator, in the plane of the terrestrial, an imaginary great circle in the heavens, the plane of which is perpendicular to the axis of the earth. It is everywhere 90° distant from the celestial poles, which coincide with the extremities of the earth's axis, supposed to be produced to meet the heavens. During its apparent yearly course the sun is twice in the celestial equator and twice vertically over the terrestrial equator, at the beginning of spring and



of autumn. For the magnetic equator, see **ACLINIC LINE**.

**Eq'uator'ial**, an astronomical instrument contrived for the purpose of directing a telescope upon any celestial object and of keeping the object in view for any length of time, notwithstanding the daily motion of the earth. For these purposes a principal axis, resting on firm supports, is mounted exactly parallel to the axis of the earth's rotation; it consequently points to the poles of the heavens, being fixed so as to turn on pivots at its extremities. To this there is attached a telescope, moving on an axis of its own, in such a way that it may either be exactly parallel to the other axis or at any angle to it; when at right angles it points to the celestial equator. By this means a star can be followed by one motion from its rising to its setting. In some observatories the equatorials have the necessary motion given them by clockwork.

**Eques'trian Order**, the order of knights in ancient Rome. The *equites*, or knights, originally formed the cavalry of the army. They are said by Livy to have been instituted by Romulus, who selected 300 of them from the three principal tribes. About 123 B. C. the *equites* became a distinct order in the State, and the judges and the farmers of the revenue were selected from their ranks. Toward the end of the Republic they possessed much influence.

**E'quinoc'tial**, in astronomy, the circle in the heavens otherwise known as the celestial equator. When the sun is on the equator, there is equal length of day and night over all the earth; hence the name *equinoctial*. *Equinoctial gales* are storms which are observed generally to take place about the time of the sun's crossing the equator, that is, at the vernal and autumnal equinoxes, in March and September. *Equinoctial points* are the two points wherein the celestial equator and ecliptic intersect each other; the one, being in the first point of Aries, is called the *vernal* point; and the other, in the first point of Libra, the *autumnal* point. These points are found to be moving backward or westward at the rate of 50'' of a degree in a year. See **PRECESSION OF THE EQUINOXES**.

**E'quinox**, the precise time when the sun enters one of the equinoctial points, or the first point of Aries about the 21st of March, and the first point of Libra about the 22d of September, making the day and night of equal length all over the world. At all other times the lengths of the day and of the night are unequal, their difference being the greater the more we ap-

proach either pole, while in the same latitude the difference is everywhere the same.

**Eq'uisse'tum**. See **HORSETAIL RUSH**.

**Eq'uity**, in law, a system of law administered in certain courts, originally founded upon justice, rather than precedent, but now consisting of well defined principles, which are liberally interpreted and developed to meet new exigencies. It aims to assist the defects of the common law by extending relief to those rights of property which the strict law does not recognize, and by giving more ample redress than the ordinary tribunals afford. Courts of equity grant redress to all parties where they have rights, and they modify and fashion that redress according to circumstances. They bring before them all the parties interested in the subject-matter of the suit and adjust the rights of all. See **CHANCERY, COURT OF; LAW; COMMON LAW**.

**E'ra of Good Feel'ing**, the name applied to the period of Monroe's administrations, between 1817 and 1825, when national political strife seemed absent, the Democrats having a large majority and the Federalist party being almost extinct. However, during this period the issues of tariff, internal improvements and the national bank were arising, and some of the most bitter contests in American history were taking place in Congress.

**Er'asis'tratus**, an ancient Greek physician, born about 340 or 325 B. C., the first who systematically dissected the human body. His description of the brain and nerves is much more exact than any given by his predecessors.

**Eras'mus**, **DESIDERIUS** (1467-1536), a celebrated scholar and writer, born in Rotterdam, Holland. He was ordained for the priesthood, but soon entered the University of Paris and spent most of his life in France, England, Holland and Italy. He was seldom connected with any institution of learning, but acted as a private tutor and was for a short time professor of theology and Greek at Cambridge University. He became widely known through his writings and lectures and was regarded as the ablest scholar of his time. He was an intimate associate of Luther, but when the Reformation broke out he sided with neither party.

Erasmus contributed considerably to the importance of education. He divided it into four parts, religious or ethical culture, intellectual culture, material culture and formal culture. By material culture he meant about the same as is now included under manual training. He

## Erastus

believed in private instruction and was opposed to large schools, because of their influence on the health and morals of the pupils. He advocated the education of girls on a plan similar to that for boys; he also declared that rich parents should teach their children some trade.

**Eras'tus**, the learned name of Thomas Lieber (1524–1583), a Swiss physician, who maintained the opinions from which the well-known epithet of *Erastian*, as now used, is derived. He was successively professor of medicine at Heidelberg and of ethics at Basel. He maintained in his writings the complete subordination of the ecclesiastical to the secular power; and he declared that the Church had no right to exclude any one from church ordinances or to inflict excommunication.

**Er'ato**, in Greek mythology, the Muse who presided over lyric and, especially, amatory poetry.

**Erckmann-Chatrian**, *erk'man shat tre ahN'*, the joint name of two French-Alsatian writers of fiction. EMILE ERCKMANN (1822–1899) was born at Pfalzburg, and ALEXANDRE CHATRIAN (1826–1890) was born at Soldatenthal, near Pfalzburg. The scenes of most of their stories are laid in the district in which they were both born, which then belonged to France, but which was afterward annexed to Germany. They formed a literary partnership in 1847, but it was not until 1859 that success attended them. In their list of novels the best-known and most popular are *The Conscript*, *Friend Fritz* and *Waterloo*, a sequel to *The Conscript*.

**Er'ebus**, in Greek mythology, the son of Chaos and Darkness. The name Erebus was also given to the lower world.

**Erebus and Terror**, the names of two volcanoes in South Victoria Land. They were both discovered by Sir J. C. Ross in 1841, who named them from two vessels used in his expedition. The former is 12,370 feet high, and the latter, about 30 miles farther east, is 10,900 feet high.

**Er'echthe'um**, a temple of the Ionic order in Athens, dating from the end of the fifth century B.C. It contained a shrine to Athene, two to Erechtheus (whence the name), the salt spring of Poseidon, the sacred olive of Athens and other sacred memorials. The building is square, with porticoes on three sides. The east portico extends across the front and is adorned with six Ionic columns. On the south side at the west end is the famous Porch of the Caryatides, whose rich entablature rests on the heads of six female

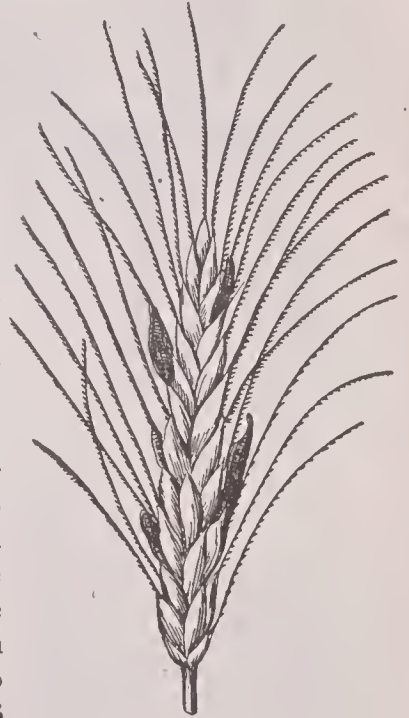
## Eric the Red

figures a little larger than life, ranking as the finest of architectural sculpture. The frieze was decorated with white marble reliefs, only fragments of which remain to-day.

**Erfurt**, *er'foort*, an important town in the Prussian province of Saxony, on the Gera, 14 mi. w. of Weimar. It has a fine cathedral, dating from the thirteenth century, and several handsome Gothic churches. The university, founded in 1378 and suppressed in 1816, was long an important institution. There are still a royal academy of science and a royal library with 60,000 volumes. The monastery (now an orphanage) was the residence of Luther from 1501 to 1508. The manufactures are varied, including clothing, machinery, leather, shoes, ironmongery and chemicals. Erfurt was one of the most important commercial towns of central Germany in the Middle Ages. Population in 1910, 111,461.

**Ergot**, *ur'got*, the altered seed of rye and other grasses, the change being caused by the attack of a fungus. The seed is replaced by a dense close-grained tissue, largely charged with an oily fluid. Ergot is poisonous, but is used as a drug, from its powerful action on the heart.

**Er'icsson**, JOHN (1803–1889), a famous engineer, born in Sweden. He served for a time in the Swedish army, removed to London in 1826 and later to New



ERGOT OF RYE

York. He is identified with numerous inventions and improvements on steam machinery and its applications. His chief inventions are his caloric engine, the screw propeller, which has revolutionized navigation, and his turret ships, the first of which, the *Monitor*, distinguished itself in the American Civil War and inaugurated a new era in naval warfare. In his later years he attempted to perfect the solar engine. See *MONITOR, THE*. (See illustration on next page.)

**Eric the Red**, a Norwegian navigator, who fled to Iceland in 982. While searching for a



western land which his countrymen had previously visited, he came upon Greenland. In 985 he returned to Iceland and organized a fleet of twenty vessels for a new voyage. Some of the ships were lost in a storm, but he succeeded in reaching the Greenland coast with fourteen. His colony was not permanent, however.

His son LEIF, twelve years later, is said to have discovered the continent of North America, which he called Markland, or Vinland.

**E'rie**, PA., the county-seat of Erie co., 95 mi. n. e. of Cleveland, Ohio, has the finest harbor on Lake Erie. The city has very great commer-



JOHN ERICSSON

cial interests, as the only lake port of the state; and it is also an important railroad center, being on the Lake Shore & Michigan Southern, the Philadelphia & Erie, the Pennsylvania and other railroads. An abundant supply of natural gas, its proximity to the coal and coke fields and its fine shipping facilities make the city an important manufacturing center. The industries include boiler and engine works, iron works, foundries, machine shops, refineries, chemical works, tanneries, paper mills, flour mills and piano and organ factories. Being the natural market for a rich farming country, the city has considerable trade in agricultural products. On Garrison Hill, opposite the entrance to the harbor, is located the state soldiers' and sailors' home. Other important institutions are the United States Marine Hospital, Hamot Hospital, Saint

Vincent's Hospital and the Protestant Home for the Friendless. Erie has a fine government building, containing the postoffice, the internal revenue and customs offices, the signal service station and the district court rooms. The public library is a part of the public school system and contains over 36,000 volumes. The land-locked harbor is protected by Presque Isle, a peninsula six miles long and a mile wide. A fort of this name was built on the site of the present city in 1753. The settlement was laid out in 1795 and was chartered as a city in 1851. Gen. Anthony Wayne died here in 1796, and the state has erected a memorial in the form of a blockhouse. The fleet of Commodore Perry was built and equipped at Erie, and here that naval officer made his headquarters during the War of 1812. Population in 1900, 52,733; in 1910 it was 66,525.

**Erie**, LAKE, one of the great chain of North American lakes, between lakes Huron and Ontario. It is about 240 miles long and 40 miles broad and has an average depth of 120 feet. The fall from Lake Erie to Ontario is 326 feet. The whole of its southern shore is within the territory of the United States, and its northern within that of Canada. It receives the waters of the upper lakes by Detroit River, at its western extremity, and discharges its waters into Lake Ontario by the Niagara River, at its northeast end. The Welland Canal enables vessels to pass from it to Lake Ontario (See WELLAND CANAL), and the Erie Canal extends from Buffalo to Albany and connects Lake Erie with the Hudson River (See ERIE CANAL). It is shallow, compared with the other lakes of the series, and is subject to violent storms. Lake Erie washes the shores of Michigan, Ohio, New York and Pennsylvania, which it separates from Ontario, Canada. The principal harbors are Buffalo, Erie, Cleveland, Sandusky and Toledo.

**Erie**, LAKE, BATTLE OF, an important naval battle of the War of 1812, fought on Lake Erie, September 10, 1813, between a squadron of nine small vessels, under Commodore Perry of the United States navy, and one of six vessels, under Commodore Barclay of the British navy. The *Lawrence* was Commodore Perry's flagship, and for two hours it bore the brunt of a terrible battle. When it was almost a total wreck, Perry left the vessel and crossed in a small row-boat, under the concentrated fire of the British fleet, to the *Niagara*, where he again raised his pennant. Bringing the rest of the American fleet into close action, within ten minutes he

## Erie Canal

compelled the British to strike their colors. Then he sent the famous message to the government officials, "We have met the enemy and they are ours." See WAR OF 1812.

**Erie Canal'**, a canal extending from Buffalo to Troy and Albany, N. Y., and connecting Lake Erie with the Hudson River. The Erie Canal was begun in 1817 and completed in 1825, at a cost of \$7,602,000. It was 363 miles long, 28 feet wide at the bottom, 40 feet wide at the top and 4 feet deep. The canal was carried over several rivers on stone aqueducts.

The construction of the Erie canal was due to the energy and foresight of De Witt Clinton, who was governor of New York during most of the time it was under construction. It was built by the state and is operated free of charge. This canal was the first great public work undertaken in the United States, and its completion was one of the most important events in the economic and commercial history of the country. It virtually connected the Great Lakes with the sea; it reduced the time of freight between Buffalo and Albany from 20 days to 10, and freight charges, from \$100 to \$10 per ton. It was the opening of this canal that gave New York the impetus which led her to become the leading commercial and financial city of America.

It was later enlarged to a width of 70 feet at the surface and 58 feet at the bottom, with an average depth of 7 feet. In 1897-98, about \$9,000,000 were spent on further improvements, and parts of the canal were now 9 feet deep. In 1903 a further expenditure of \$101,000,000 was authorized by the legislature. The enlarged system, together with the tributary Oswego and other canals, is known as the New York State Barge Canal. Construction work was begun in 1907, and several sections were ready for traffic by 1911. The entire system is to be completed in 1914 or 1915. The width of the channel at the bottom varies from 75 to 94 feet and at the surface from 120 to 200 feet; the wider sections are cut through rock. The new canal is 12 feet deep and will accommodate barges 310 feet long, of 2000 to 3000 tons burden. The locks, which are concrete, are 12 feet deep, 45 feet

## Ermine

wide and 328 feet long. The Erie Canal proper has 35 locks and is 323 miles long. The Oswego, the Champlain, and the Cayuga and Seneca branches have 22 locks. The barge canal with all its branches has a length of 424 miles. In connection with the canal, two large reservoirs, the Delta and the Hinckley, were constructed on the upper Mohawk. The Delta reservoir with a capacity of nearly 300,000,000 cubic feet is about 3 miles north of Rome. The Hinckley reservoir holds about 3,500,000,000 cubic feet. On the lower Mohawk, near Schenectady, movable dams have been constructed, the first of this type in America. See CANAL.



ERIE CANAL

**E'ris**, in Greek mythology, the goddess of discord.

**Ermine**, *ur'min*, or **Stoat**, *stote*, a species of weasel found over temperate Europe, but most commonly in the north. Like many other species of this genus, the ermine has the faculty of ejecting a fluid of a musky odor. In winter, in cold countries or severe seasons, the



ERMINE IN WINTER DRESS

fur changes from a reddish brown to a yellowish white, or almost pure white, under which shade the animal is recognized as the ermine. In both states the tip of the tail is black. Its fur is short, soft and silky. The best skins are brought from Russia, Sweden, Norway and Northern Canada. It is one of the insignia of royalty and is used on the robes of judges. Much of the fur now sold as ermine is the fur of the white rabbit.



## Erosion

**Ero'sion**, in geology and physiography, the process of wearing away portions of the earth's surface. The principal agents of erosion are rain, running water, waves, ice and the atmosphere. Rain water contains ammonia, carbonic acid and frequently small quantities of muriatic and nitric acids. These substances decompose some of the rocks on which the rain falls. When rain strikes the earth a portion of it soaks into the soil and penetrates to some distance beneath the surface. This water collects in cavities in various strata, and some of it reappears in springs. Another portion runs down the slopes, carrying with it more or less of the soil, dust and particles of decomposed rocks and depositing these on lower levels.



THE GRAND CANYON OF THE COLORADO RIVER  
An example of the work done by erosion

The different degrees of hardness at various points on the surface of slopes, as well as their original unevenness, cause the water to flow down them in rills and rivulets. Each of these cuts a channel for itself. Thus the slopes are made still more uneven by running water, and it is in this way that hillsides are sculptured in such a variety of forms. The deep valleys between the plateaus are excavated in the same way (See CANYON). The main stream in a valley also wears away more or less of the valley floor. A large stream like the Mississippi, flowing through a region of loose rock, will form a wide valley with broad, gentle slopes, but wherever the current is swift, the stream may have its channel defined by abrupt banks, which are usually low and contain here and there high bluffs. See VALLEY.

Waves are confined in their action to the

## Erzerum

shore line, but along the seacoast, wherever breakers occur, they are continually wearing away the rock. Waves also carry out with the undertow more or less sand and gravel from the beach. Thus the shore line is gradually extending. Similar effects are produced on large bodies of fresh water like Lake Superior, but they are not so distinctly marked nor so extensive.

Ice acts principally by breaking and crumbling rocks through the freezing of water. This so disintegrates the rock that particles of it are easily carried away by water. Wherever glaciers exist, their movement is attended with erosion, as well as transportation of material (See GLACIERS).

The atmosphere works both by mechanical and chemical action. The oxygen, carbon dioxide, water vapor and other substances found in the atmosphere tend to decompose rocks and form new compounds. In the arid regions the wind wears away rocks in certain localities and denudes those in others. Much of the sculpturing in the Rocky Mountain regions is due to this cause.

**Erratics** or **Erratic Blocks**, in geology, boulders, or large masses of angular rock, which have been transported to a distance from their original mountains by the action of ice during the glacial period. Thus, on the slopes of the Jura Mountains immense blocks of granite are found, which have traveled 60 miles from their original location. Similarly, masses are found in numerous places in the United States. See BOULDER.

**Er'sip'elas**, a very infectious bacterial disease, which is sometimes an epidemic in hospitals, especially military hospitals in time of war. It is not, however, a purely hospital disease, but affects individuals who have been exposed to the contagion. It usually appears upon the head or face, in the form of an inflammation of the skin, accompanied by swelling and pain, and may terminate in fever and delirium.

**Erzerum** or **Erzeroum**, *er z'room'*, a city of Turkish Armenia, capital of the province of the same name. The town is about 6000 feet above sea level, forms an important strategical center and has become a principal frontier fortress. In addition to important manufactures, especially in copper and iron, it carries on an extensive trade and is a chief halting place for Persian pilgrims on their way to Mecca. Population, about 40,000.



## Esarhaddon

**E'sarhad'don**, a king of Assyria. He came to the throne in 680 B. C., on the death of his father, Sennacherib, and his first work was to punish his brothers, who had killed Sennacherib. Besides the war against his brothers, he was engaged in a conflict with the Chaldeans and in an expedition against Egypt, which he reduced to the condition of an Assyrian province.

**E'sau**, the eldest son of Isaac and twin brother of Jacob. The story of his marriage, of his loss of birthright through the craft of Rebekah and Jacob and of his quarrel and reconciliation with Jacob is told in the book of *Genesis*. He was the progenitor of the Edomites, who dwelt on Mount Seir.

**Escanaba**, *es'ka naw'ba*, MICH., a city and the county-seat of Delta co., on Little Bay, 121 mi. n. of Green Bay, on the Chicago & Northwestern and other railroads. It has a good harbor and is one of the most important shipping points for the Lake Superior iron region. It was first settled in 1863 by employes of a railway company and became a city in 1883. Population in 1910, 13,194.

**Escape'ment**, the general contrivance in a timepiece, by which the pressure of the wheels, which move always in one direction, and the vibratory motion of the pendulum or balance-wheel, are accommodated to each other. By this contrivance the wheelwork is made to communicate an impulse to the regulating power, which in a clock is the pendulum and in a watch the balance wheel, so as to restore to it the small portion of force which it loses in every vibration, in consequence of friction and the resistance of the air. The leading requisite of a good escapement is that the impulse communicated to the pendulum or balance wheel shall always be the same, notwithstanding any irregularity in the train of wheels. See CLOCK; WATCH.

**Esco'rial** or **Escu'rial**, a remarkable building in Spain, near Madrid, comprising a palace, a convent, a monastery, a church and a mausoleum. It was built by Philip II and was dedicated to Saint Lawrence, in commemoration of the victory of Saint Quentin, fought on the festival of the saint in 1557. It is built on the plan of a gridiron, because Saint Lawrence is said to have been broiled alive upon one of these. It was begun in 1563 and was finished in 1584. The church, the finest portion of the whole building, is richly decorated and contains a crypt, or royal tomb, in which are buried all but two of the kings of Spain since Charles V. The dome is 60 feet in diameter, and its height

## Eskimo

at the center is about 320 feet. The library contains a valuable collection of some 30,000 books and manuscripts. The principal entrance to the palace is opened but twice during each reign, once to admit the king on his first visit to the place, and a second time when his dead body is carried through. Fire and lightning have frequently damaged the Escorial, but it has repeatedly been repaired, so that it represents to-day an expenditure of \$10,000,000.

**Esdraelon**, *es dra e'lon*, or **Plain of Jezreel**, a plain extending across Palestine, from the Mediterranean to the Jordan, and drained by the river Kishon. It separates the mountain ranges of Galilee from those of Samaria. It is bounded on the west by Mount Carmel, on the north by the hills of Galilee and on the southeast by Gilboa. In this plain many contests, of both ancient and modern times, have been fought.

**Es'dras**, BOOKS OF, certain books of that portion of the Old Testament known as *Apocrypha*. They are generally divided into the *First Book of Esdras* and the *Second Book of Esdras*. As ordinarily considered, the first book includes the book of *Ezra*, a portion of *Nehemiah* and the last two chapters of *II Chronicles*. The second book consists of the revelation of Esdras and somewhat resembles in its nature the book of *Revelations*. It consists of a series of visions regarding the mysteries of the moral world and the final triumph of righteousness. The descriptions are striking, and the language is sublime. See APOCRYPHA.

**Es'kimo**, a race inhabiting the Arctic regions. They call themselves *Inu-it*, the people; the name *Eskimo* is from an Algonquin word, signifying *eaters of raw flesh*. They consist of three principal stocks: the Greenlanders; the Eskimo proper, in Labrador, and the Western Eskimo, found along Hudson Bay, the west side of Baffin Bay, the polar shores as far as the mouths of the Coppermine and Mackenzie rivers, and on both the American and Asiatic sides of Bering Strait. By some authorities they are classified with the American Indians, but other scientists consider them more closely akin to the Mongolian race. Their leading physical peculiarities are a stunted stature, flattened nose, projecting cheek bones, eyes often oblique, and yellow and brownish skin. The hair is straight and jet-black in color. Seal skins, reindeer and other furs are used as materials for dress, according to the season, as well as skins of otters, foxes and martens. In summer they live in tents covered with skins; in winter they may be said to burrow



beneath the snow. In Greenland, houses built of stone and cemented with turf are used as permanent habitations. Vegetation being extremely scarce, their food consists of the flesh of whales, seals and walruses, often eaten raw. They show remarkable skill in fishing and hunting with bows and arrows, spears or lances; these generally are pointed with bone, but occasionally with metal, which they obtain in small quantities from the whites. Their only domestic animal is the dog, which they train to draw heavy loads on rude sleds. They make a boat, or *kyak*, from oiled skin and handle it with marvelous skill. In intellect the Eskimos are by no means deficient; in manners they are kind and hospitable. Their religious ideas appear scanty, but success has attended the labors of the Danish missionaries in teaching them the Christian religion.

**Eskimo Dog**, a breed of dogs found in northern regions of America and eastern Asia. It is larger than the English pointer, but appears smaller on account of the shortness of its legs. It has oblique eyes, an elongated muzzle and a bushy tail, which give it a wolfish appearance. The color is generally a dull brown, patched with darker color. It is the only beast of burden in these latitudes, and with a team of such dogs attached to his sledge the Eskimo will cover sixty miles a day for several successive days.

**Espar'to**, a grass growing in Spain and North Africa, long used in the manufacture of cordage, matting and similar articles, and now extensively employed in paper making.

**Esperanto**, an artificial language invented by Dr. Zamenhof of Warsaw, who, under the assumed name of *Dr. Esperanto*, published his first pamphlet upon the subject in 1887. From this the language takes its name. Esperanto is claimed to be the best attempt so far to produce an international language. The vocabulary is formed by selecting first the root words which are common to all the principal European languages; second, those that are common to all but one; then those that are common to all but two, and so on. The grammar is regular and very simple. By means of an elaborate system of prefixes and suffixes the vocabulary is extended to an almost unlimited degree; thus, *bona* means good, *malbona*, bad; *fermi* means close, *malfermi*, open. The suffix *in* denotes feminine; *knabo* means boy, *knabino*, girl. Several books have been published in Esperanto. Other languages competing with Esperanto for place as an international language are Volapuk, Idiom, Neutral and Bolak.

**Es'say**, in literature, a composition which expresses the views and opinions of the author on some one subject and which is in general shorter and less formal than a treatise. At times, however, the name *essay* is given by authors to productions which might more accurately be called treatises. In the history of the essay the most important name is that of Montaigne, who may be accounted the originator of this form of composition. Among English writers, Bacon was most influential in the development of the essay. Among other essay writers in English may be mentioned Steele, Addison, Carlyle, Macaulay, Lamb, Matthew Arnold, Emerson, Lowell, Stevenson and Henry Austin Dobson.

The following list aims to include only those essays of sufficient strength or influence to possess a present power. The list might easily be doubled and still not include many well-known essays of these and other authors. (See articles on authors mentioned above.)

Bacon's *Of Studies*; Steele's *Tatler*; Addison's *Spectator*; Johnson's *Rambler*; Irving's *Salmagundi Papers*; Lamb's *Essays of Elia*; Macaulay's *Milton*; Carlyle's *Sartor Resartus*; Emerson's *Self-Reliance and Conduct of Life*; Holmes's *Breakfast Table Series*; Thoreau's *Walden*; Matthew Arnold's *Literature and Dogma*; Lowell's *Among My Books*; Stevenson's *Virginibus Puerisque*; Ruskin's *Sesame and Lilies* and *Crown of Wild Olives*.

\* **Es'sen**, a town of Rhenish Prussia, 18 mi. n. e. of Düsseldorf. It has a fine cathedral dating from 873, one of the oldest churches in Germany. The town has grown recently with great rapidity and is celebrated for the steel and iron works of Krupp, the most extensive in the world, employing about 45,000 workmen. The rifled steel cannon made here are supplied to most of the armies of Europe. Essen is situated in the center of a rich coal region. The town dates from the ninth century. Population in 1910, 294,629.

**Essequibo**, *es'se ke'bo*, a river of British Guiana, which flows into the Atlantic by an estuary 20 miles in width, after a course of about 450 miles. Its course is tortuous and is full of cataracts. It is navigable for some distance. On the banks are dense forests of locust, ebony and other trees.

**Es'sex**, THE, a famous vessel of the American navy. Under Captain Porter it was attacked by the British sloop *Alert*, August 13, 1812, but captured its opponent after a single broadside. Late in the same year the *Essex* made a notable

cruise in the Pacific Ocean, capturing fully \$2,500,000 worth of property and hundreds of seamen. However, in February, 1814, the *Essex* was confronted by two British men-of-war, the *Phoebe* and the *Cherub*, while in the port of Valparaiso, South America, and on March 28 was attacked in the open sea by the enemy. After a desperate battle, during which two-thirds of the American crew were killed or disabled, Captain Porter was forced to surrender.

**Essex Jun'to**, the name given to a group of Revolutionary leaders in Essex County, Mass., who gained fame as advocates of a strong central government. They formed the nucleus of the Federal party and were its most radical adherents during its supremacy. Among the prominent members of the Essex Junto were Fisher Ames, George Cabot and Timothy Pickering.

**Estate'**, the interest which a landholder possesses in his land. The term arises from the fact that under the old feudal system the ownership of all land was vested in the king, and all private holders of land were his tenants. The interest of such a tenant was called his estate, and this was always less than absolute ownership. Thus various classes of tenancies or estates were developed, and these persist in law to the present time. Of these estates three are called freeholds. They are the *fee simple*, that is, the right to dispose of land in any way, which suits the possessor, practically an absolute ownership; the *fee tail*, which gives the possessor the right to dispose of his land only to his own issue, and the *life estate*, which gives the possessor the right to dispose of the land only for the space of his lifetime. The estates which are not freeholds are various forms of tenancies, the difference usually being in the period over which the contract extends, whether for years, for life, from year to year, terminable at the will of either party or at the sufferance of the so-called owner of the land. See **REAL PROPERTY**.

An estate in its political meaning indicates one of several distinct classes or castes in society. Thus, under feudalism, the nobles, the clergy and the commons each constituted a separate estate. The history of the Middle Ages and the early modern period is largely the record of the contest between these three classes singly, in combination or against the Crown. The press was called by Burke the fourth estate.

**Esther**, *es'tur*, a Jewess who became the queen of Ahasuerus, king of Persia, and whose story is told in the book of the Old Testament

called by her name. Various opinions are held regarding the time and truth of the story, but it is judged by scholars of to-day as a romance, built upon some foundation of truth. The feast of Purim, which commemorates the events narrated, is still observed by the Jews during the month Adair. See **ESTHER**, **BOOK OF**, **THE**.

**Esther**, **BOOK OF**, **THE**, the last of the historical books of the Old Testament, takes its name from the Jewish maiden whose history it gives. The book is written in Hebrew, with many Persian words, which seems to prove that its date was during the Persian rule in the reign of Artaxerxes, 465-425 B. C. The word *God* does not occur in the text; neither is the book alluded to or quoted in the New Testament, and with the exception of Esther's fast no religious act is spoken of.

**Esthet'ics**, that branch of philosophy which deals with the principles of beauty in nature and art. Socrates, Aristotle, Plato and other ancient philosophers recognized the science of the beautiful, but modern systems of esthetics date from the middle of the eighteenth century. At that time the German philosopher Baumgarten advanced a theory that the mind possessed a special power for appreciating the beautiful, and that this power did not depend upon the intellect, though the intellectual power might be necessary to develop the esthetic power.

There are now two schools of esthetics. One considers the great works of art to form the standards of beauty. Starting with these and the most perfect models of nature, this school seeks to create a new work, in which shall be combined as many as possible of the features of the original. The other school considers the most perfect elements of beauty to be found in the works of nature and believes that it is by combining these elements that the greatest works of art, such as the Apollo Belvedere, have been produced. This school considers the ability to select these elements to be due to the esthetic power of the mind, and that it is by this power that one's ideals of the beautiful are formed.

**Etch'ing**, the process of engraving metal plates by means of an acid. The plate is cleaned and covered with an *etching ground*, which is a composition of Egyptian asphaltum, virgin wax and Burgundian pitch. This protects the surface from the action of the acid. The design is then cut through this coating with steel tools, called *etching needles*, and the plate is placed in a weak solution of nitric acid. The acid eats, or "bites," the design in the plate. The different



degrees of light and shade are produced by etching some portions of the plate more than others. After the lines which require but little etching have been formed, that portion of the plate is again covered with etching ground and the action of the acid on it stopped. Some of the finest works are reproduced by combining etching and engraving in the preparation of the plates. See ENGRAVING; ZINC ETCHING.

**Etesian**, *e te'zhan*, **Winds**, the name of the north and northeast winds which blow across the Mediterranean during the summer. They are supposed to be caused by the extreme heat over the Desert of Sahara. See WIND.

**Eth'elbert**, (about 552-616), king of Kent, succeeded his father in 560. He reduced all the Anglo-Saxon states except Northumberland to the condition of dependents. Ethelbert married Bertha, a Christian princess, the daughter of the king of Paris, an event which led indirectly to the introduction of Christianity into England by Saint Augustine.

**Ethelbert**, (?-866), king of England, son of Ethelwulf, succeeded to the government of the eastern side of the kingdom in 855, and five years later, on the death of his brother, he became sole king. The Danes troubled the country during his reign.

**Eth'elred I** (?-871), king of England, son of Ethelwulf, succeeded his brother Ethelbert in 866. The Northmen became so formidable in his reign as to threaten the conquest of the whole kingdom.

**Ethelred II**, surnamed *the Unready* (968-1016), king of England, son of Edgar, succeeded to the throne in 978. From the beginning of his reign he had trouble with the Danes. After repeated payments of tribute, he ordered, in 1002, a massacre of the Danes; but in revenge Sweyn gathered a large force and spread desolation through the country. The Danes were again bribed to depart; but upon a new invasion Sweyn obliged the nobles to swear allegiance to him as king of England, while Ethelred fled to Normandy. On the death of Sweyn he was invited to resume the government and died at London in the midst of his struggle with Canute.

**Eth'elwulf**, (?-858), king of Wessex and Kent, succeeded his father Egbert about 839. His reign was in great measure occupied in repelling Danish incursions. When, on his return, in 856, from a journey to Rome, he found that his son Ethelbald had usurped his throne, he made no attempt to regain his power. Alfred the Great was a son of Ethelwulf.

**E'ther**, an extremely rare medium, without weight or color, but possessing great elasticity and supposed to extend throughout all space. Scientists suppose ether to be the medium which transmits light and heat from the heavenly bodies. See HEAT; LIGHT.

**Ether**, also called *sulphuric ether*, a very light, volatile liquid, which burns easily and has a pleasant, sweetish smell. It is used to make persons insensible to pain, when they are to have an operation performed. It is also used as a medicine, when placed under the skin, and to dissolve fats, resins and some other substances.

**Eth'ics** (also called Moral Philosophy) is the science which treats of the nature and laws of the actions of men, considered as to whether they are right or wrong, good or bad. The science is more or less closely connected with theology, psychology, politics, political economy and jurisprudence, but what most strictly belongs to it is the investigation of the principles and basis of duty, or the moral law, and an inquiry into the nature and origin of the mental powers by which duty is recognized. Various answers have been given to the question why we call an action good or bad. It is said that it is to be answered by determining whether it is consistent or not with the will of God, or with the nature of things, or with the greatest happiness of the greatest number, or whether conscience decides it to be right or wrong. Accordingly, a great variety of ethical systems have been proposed. Most modern philosophers consider the subject as apart from theology and as based on independent philosophical principles. Modern systems fall into two great classes—the utilitarian systems, which recognize happiness as the chief good, that is, the greatest possible satisfaction of the tendencies of our nature; and the rationalistic systems, which recognize that ideas of law and obligation can have their source only in reason. Another theory of ethics places the moral principle in the sentimental part of our nature, that is, in the direct sympathetic pleasure or sympathetic indignation we have with the impulses which prompt to action or expression.

**E'thio'pia** or **Aethiopia**, in ancient geography, the name applied to the country lying to the south of Egypt and comprising the modern Nubia, Kordofan and Abyssinia. Its limits, however, were not clearly defined. It has been held by some that Egyptian civilization was in a measure received from Ethiopia, but it is generally believed that the reverse was the case. The connection between the two countries was

at all times very close, and about the eighth century B. C. the Ethiopians were able to impose a dynasty on Lower Egypt. Cambyses, king of Persia, invaded the country about 530 B. C. and destroyed the capital city, Napata. From this time the country is known by the name of the kingdom of Meroë, from the name of the capital city which replaced Napata, and it was this kingdom that Augustus conquered in 22 B. C., making it tributary to Rome. However, the Roman hold on Ethiopia was never very strong.

**E'thiop'ic Language**, or, more accurately, Geez language, the old official and ecclesiastical language of Abyssinia. It is a Semitic language, resembling Aramaic and Hebrew, as well as Arabic. It has a Christian literature of some importance, including a translation of the Bible, which contains both Old and New Testaments and the Apocrypha, as well as several supplementary apocryphal books. Besides this, there is a large amount of theological literature, including translations from the Greek fathers, lives of the saints and hymns.

**Ethnography**, a science that describes human races and peoples; for that reason, a branch of anthropology. The study of foreign races interested the ancients to a certain extent, but it was not until the time of the discovery of America that the civilized peoples made systematic efforts to study and describe other human races. Since that time, however, the ethnographer has been constantly at work, and now the great governments of the world have established bureaus for the purpose of investigating not only their own primitive peoples and the different races that come under their rule, but also the tribes and clans of other nations. At Washington, the bureau of American ethnography devotes itself to the study of our Indian tribes.

**Ethnology**, that division of anthropology which treats of the customs and habits of life and of the arts, religion and government of man, as well as his tribal relations and his distribution over the earth. See RACES OF MEN.

**Eth'yl Alcohol**. See ALCOHOL.

**Eth'ylen**e. See OLEFIANT GAS.

**Et'iola'tion**. When a plant grows in the dark, it becomes pale and almost colorless and has much more slender and less vigorous shoots, which sometimes become very long and entirely unlike the normal plant. The change of color is owing to the fact that no chlorophyll can be produced without the aid of sunlight, and the manner of growth is occasioned by the instinctive

search of the plant for light. This change in color and appearance is known as etiolation.

**Et'na**, PA., a borough in Allegheny co., on the Allegheny River, opposite Pittsburg, and on the Pennsylvania and the Pittsburg & Western railroads. It is a suburb of Pittsburg and contains furnaces, rolling mills, pipe works and other manufactures. Population in 1910, 5830.

**Etna** or **Aetna** or **Mongibello**, the greatest volcano in Europe, in Sicily, near the city of Catania. Its loftiest summit is 10,755 feet high. It rises immediately from the sea, has a circumference of more than 100 miles and dominates the whole northeast part of Sicily. There are a number of towns on its lower slopes. The top is covered with perpetual snow; at the foot is a region of orchards, vineyards and olive groves; midway is the woody or forest region. Etna thus presents the variety of climates common to high mountains in lower latitudes. A more or less distinct margin of cliff separates the mountain proper from the surrounding plain; and the whole mass seems formed of a series of superimposed mountains, the terminal volcano being surrounded by a number of cones, all of volcanic origin, nearly one hundred of which are of considerable size. From the summit a splendid panorama is presented, embracing the whole of Sicily, the Lipari Islands, Malta and Calabria. The eruptions of Etna have been numerous, and many of them destructive. That of 1169 overwhelmed Catania and buried 15,000 persons in the ruins. In 1669 the lava spread over the country for forty days, and 10,000 persons are estimated to have perished. In 1693 there was an earthquake during the eruption, when over 60,000 lives were lost. One eruption was in 1755, the year of the Lisbon earthquake. Among more recent eruptions are those of 1832, 1865, 1874 and 1879. See VOLCANO.

**E'ton College**, one of the most famous public schools of England, established by Henry VI in 1440, under the name of *The College of the Blessed Mary of Eton beside Windsor*. The original building, begun in 1441, is still occupied, but since that day many additional buildings have been erected. The school was originally intended for the sons of poor but worthy Englishmen and also for the support of twenty-five poor, infirm men. It has now become the school of the gentry and nobility, and the applications are so numerous that it is customary to enter application at the birth of the child, in order to insure his admission by the time he is of proper age. Students are not admitted under twelve



## Etruria

years of age or over fourteen. The work of the school is wholly of a preparatory nature, and a large portion of the time is devoted to the study of the classics, though modern languages, mathematics and sciences are now given due attention. The present enrollment is about 1000.

**Etru'ria**, a name given by the ancient Romans to that part of Italy bounded by the Apennines, the Tiber and the Mediterranean. The inhabitants came originally from Asia Minor, and, according to their own legends, they were settled in Italy and were in a flourishing condition by the middle of the eleventh century B. C. It is certain that at the time of the foundation of Rome Etruria was the most civilized portion of Italy.

There were at one time three Etruscan confederacies, each composed of twelve city states. Each state had its own government, the power being vested in officers called *lucumo*. From the earliest times the Etruscans were engaged in constant warfare with Rome, which terminated in the complete subjugation of Etruria through a series of Roman victories, from the fall of Veii in 396 B. C. to the Battle of Vadimonian Lake in 283 B. C. Their desire for military and commercial supremacy was changed to a love of luxury, and up to the second century B. C. the great Etruscan cities far surpassed Rome in wealth and splendor.

Etruscan art was in the main borrowed from Greece. Great quantities of relics have been found in the tombs, especially jewelry and painted vases, which are popularly called Etruscan vases, though they are undoubtedly productions of Greek workmen. See ETRUSCAN VASES.

**Etruria**, a kingdom of Italy, founded by Napoleon I in 1801. Its capital was Florence. In 1808 Napoleon incorporated it with the French Empire.

**Etrus'can Vases**, a class of beautiful, ancient, painted vases, made in Etruria, but not products of Etruscan art, since they were really the productions of Greek workmen, the subjects, style and inscriptions being all Greek. A great number have been found in the tombs in Etruria and in Campania, Sicily. They are elegant in form and are enriched with bands of beautiful foliage and other ornaments and figures of a highly artistic character. One class has black figures and ornaments on a red ground, the natural color of the clay; another has the figures of the natural color and the ground painted black. During a later period of Etruscan art there was

## Euboea

much variety in the form and ornamentation of these vases, gold and other colors being frequently made use of in their embellishment.

**Et'ty**, WILLIAM (1787-1849), an English painter. He studied at the Royal Academy and afterwards traveled in Europe, especially in Italy, where, from his study of the Venetian masters, he acquired his taste for rich coloring, for which his works are principally known. His pictures lack originality and vigor, but the general composition is good. His principal works are a series of three *Judith* pictures, *Ulysses and the Sirens*, *Beniah*, *David's Chief Captain* and three pictures of *Joan of Arc*.

**Et'y mol'ogy**, a term applied, (1) to that part of grammar which treats of the various inflections and modifications of words and shows how they are formed from simple roots (See GRAMMAR); (2) to that branch of philology which traces the history of words from their origin to their latest form and meaning. Etymology in this latter sense, or the investigation of the origin and growth of words, is among the oldest of studies. Plato and other Greek philosophers, the Alexandrian grammarians, the Roman Varro and others wrote much on this subject. It is not until recent times, and particularly since the study of Sanskrit, that etymology has been scientifically studied. Languages then began to be properly classed in groups and families, and words were studied by a comparison of their growth and relationship in different languages. It was recognized that the development of language is not an arbitrary or accidental matter, but proceeds according to general laws. See PHILOLOGY.

**Euboea**, *u be'ah*, the largest, and in ancient times the most important, of the Grecian islands in the Aegean Sea. It lies off the eastern coast of central Greece and has a length of 98 miles and an average width of 30 miles. It is traversed by mountains, the loftiest of which reach a height of over 5000 feet. Its fertile soil made Euboea one of the chief sources of the grain supply of ancient Athens, and it still produces grain, oil, figs and wine. The honey of Euboea is highly praised, also. The chief towns are Chalcis and Eretria.

The earliest inhabitants were the Abantes, or Dryopes. About 1100 B. C. the Ionians settled the island and soon raised it to importance. The island became celebrated for its learning, was the seat of the Euboean school of philosophy and for a long time was the home of Aristotle. The state was subdued by Athens after the

## Eucalyptus

Persian Wars; in 1470 it was taken by the Turks. Together with the island of Skyros, Euboea forms a province of Greece. Population of the province in 1907, 116,903.

**Eu'calyp'tus**, a genus of trees, mostly natives of Australia, remarkable for their gigantic size some of them attaining the height of 480 or 500 feet. In the Australian colonies they are known by the name of gum trees, from the gum which exudes from their trunks. The wood is excellent for ship-building and similar purposes. The *blue gum*, famous for its rapid growth and ability to live through long periods of drought, is one of the best known species, and it has now become thoroughly naturalized in California, Florida and others of the Gulf states. The oil of eucalyptus is used medicinally, and a pleasing wine or beer is made from the sap of one species.

**Euchre**, *u'kur*, a game played by two, three or four persons, with a pack of cards from which all below seven or nine, as may have been agreed upon, have been rejected (See CARDS, PLAYING). Each player is dealt five cards, two together and then three together, after which the trump is turned. If the trump turned is a jack it counts one to the dealer. The one to the left of the dealer may order the dealer to take up the trump, or he may *pass*. He does the former if he thinks he has a hand strong enough to win three tricks, and the dealer, discarding one of his cards, takes up the trump. If the non-dealer passes, the dealer's partner may order up the trump by saying "I assist," or he may pass, and so on, until the dealer's turn comes, when he takes up the card or turns it down, the latter meaning that he, too, passes. If the dealer passes, the first player to his left may make the trump what he likes. It is usually the suit of the same color. If the play passes around the second time and no one makes the trump, the deal passes to the left. It is a rule of the game that suit must be followed whenever possible. The object is to win at least three tricks out of the five, and if the one who made the trump fails to win three, he



BLUE GUM

## Eugene

is *euchred*, and his opponent scores two. If he takes five tricks he scores two points. If he wins three or four tricks he scores one point. The cards rank as they do in whist, but in the trump suit the *right bower*, or jack of trumps, stands highest; the *left bower*, the other jack of the same color, is next, then ace, king, queen, and so on, in order, to the lowest. Sometimes in four-handed euchre it is permitted for one of the players to *play it alone*, in which case his partner lays down his cards and takes no part in the hand. If the player wins five tricks he counts four points; if three tricks, one point. If he fails to make three, the opponent scores two. A game of euchre consists either of five or ten points, unless another number is agreed upon. A three-handed game, when two players combine against one, is known as *cut-throat euchre*.

**Euclid**, *u'klid*, of Alexandria, a distinguished Greek mathematician who flourished about 300 B. C. His *Elements of Geometry*, in thirteen books, are still extant, and the name Euclid is to-day synonymous with elementary geometry. The severity and accuracy of his methods of demonstration have as a whole never been surpassed. Besides the *Elements*, some other works are attributed to Euclid.

**Eugene**, *u'jeen'*, ORE., the county-seat of Lane co., about 125 mi. s. of Portland, on the Willamette River and the Southern Pacific Railroad. The city has excellent public schools, a business college, private schools and a Bible University. Eugene is the seat of the state university. There is a city hall, a city library, courthouse, theater, a well-equipped fire department, a water system owned by the city, an electric light plant and a street railway system. It is the center of a fertile agricultural district. The manufactures include lumber, flour, foundry products, woolen goods, excelsior and other products. Population in 1910, 9009.

**Eugene**, *o zhane'*, FRANCOIS (1663-1736), a famous general, commonly known as Prince Eugène of Savoy, born in Paris. Offended with Louis XIV, he entered the Austrian service in 1683, serving his first campaign as a volunteer against the Turks. At the end of the war he was sent as commander in chief to Hungary. The War of the Spanish Succession brought Eugène again into the field, and with the imperial army, in coöperation with Marlborough, he frustrated the plans of France and her allies. In the Battle of Blenheim, Eugène and Marlborough defeated the French and Bavarians, and in the next year, returning to Italy, he forced the



## Eugenics

French to raise the siege of Turin and in one month drove them out of Italy. During the following years he fought on the Rhine, took Lille and, in conjunction with Marlborough, defeated the French at Oudenarde and Malplaquet, where he himself was dangerously wounded. After the recall of Marlborough, his progress was in a great measure checked. In the war with Turkey, in 1716, Eugène won two great victories and took Belgrade, after having gained a decisive victory over a third army that came to its relief. During fifteen years of peace which followed, Eugène served Austria faithfully in the cabinet.

**Eugenics**, the modern science which studies the principles of heredity and attempts to apply them to race improvement. The word *eugenics*, which is from the Greek meaning *good birth*, was first used by Sir Francis Galton, the founder of the science, which he defined as "the study of agencies that may improve or impair the racial qualities of future generations, either mentally or physically."

The laws of heredity declare that the qualities of every child come from his ancestors, near and remote; and experiments with the higher animals prove clearly what may be done if all but the most perfect individuals are eliminated. If, then, the state had the right and the power to prevent marriage and reproduction among all but those who are most fit, physically, mentally and morally, vast differences might be seen in the race within a few generations. But the most enthusiastic advocate of eugenics would deny the desirability of such a course, even were it practicable; for all agree that the science must be kept human, and that love and initiative on the part of those making marriages are factors which must be preserved.

One thing the state can do—prevent the marriage of the feeble-minded and the hereditary criminal classes; and this would in itself be a vast improvement. In earlier and less humanitarian times, those who were feeble in mind or in body tended to be crushed out in the struggle for existence; but the charity of the present day helps to keep such people alive, and at the same time does nothing to prevent their bringing into the world children who can be neither helpful nor happy. Such agencies, too, as war, which cause the death of many of the strongest men, necessarily result in a lower physical standard.

Looked at from any point of view, there are insuperable difficulties in the way of a strict enforcement of the principles of eugenics. Much

## Euphrates

can be done, and is being done, however, by the wide spread of the new doctrines among intelligent men and women. For it is through personal enlightenment, rather than through state interference, that the improvement must come.

**Eugenie-Marie de Montijo**, *o zha ne'mah-re' de mon te'hyo* (1826– ), formerly empress of the French. Her father, the Count de Montijo, was of a noble Spanish family; her mother was of Scotch extraction. In 1853 she became the wife of Napoleon III and empress of the French. When the war broke out with Germany she was appointed regent during the absence of the emperor, but the revolution forced her to flee from France. She went to England, where she was joined by her son, and afterwards by the emperor. In 1873 Napoleon died, and six years later the prince imperial was slain while serving with the English army in Africa, in the Zulu War. In 1881 the empress transferred her residence to Farnborough, in Hampshire, England.

**Eulenspiegel**, *oi'len shpe'g'l*, TILL, a name which has become associated in Germany with all sorts of wild, whimsical frolics and with many amusing stories. Some such popular hero of tradition and folklore seems really to have existed in Germany, probably in the first half of the fourteenth century, and a collection of popular tales, originally written in Low German, purports to contain his adventures.

**Euphorbia**, *u for'by ah*. See SPURGE FAMILY.

**Euphrates**, *u fra'teez*, a celebrated river of western Asia, in Asiatic Turkey, having a double source in two streams rising in central Armenia. Its total length is about 1750 miles, and the area of its basin 260,000 square miles. It flows mainly in a southeasterly course through the great alluvial plains of Babylonia and Chaldea, till it falls into the Persian Gulf by several mouths, of which only one in Persian territory is navigable. About 100 miles from its mouth it is joined by the Tigris, when the united streams take the name of Shat-el-Arab. It is navigable for about 1100 miles, but navigation is somewhat impeded by rapids and shallows. Through its yearly overflow, however, which takes place in the spring, it confers great benefit on the country through which it flows. The river is of great historical importance, having been connected with the Assyrian and Babylonian empires, which were located on its banks. The region between the Euphrates and the Tigris on the east was the ancient Mesopotamia. The

RELIEF MAP OF EUROPE





Euphrates is also the Great River of the Old Testament.

**Euphuism**, *u'fu iz'm*, an affected style of speech, which distinguished the conversation and writings of many of the wits of the court of Queen Elizabeth. The name and the style were derived from the *Euphuus*, the *Anatomy of Wit* and the *Euphuus and His England* of John Lyly.

**Eura'sians**, a name sometimes given to the "half-castes" of India, the offspring of European fathers and Indian mothers. They are particularly common in Calcutta, Madras and Bombay. The young men are often engaged in government or mercantile offices. The girls, in spite of their dark tint, are generally very pretty.

**Eure**, *ur*, a river of northwestern France, which rises in the Department of the Orne, flows northeast through the departments of Eure-et-Loir and Eure and falls into the Seine after a course of 112 miles. It is navigable for about half its length. The chief tributary is the Iton, on the left.

**Eureka**, CAL., the county-seat of Humboldt co., is situated about 216 mi. n. of San Francisco on Humboldt Bay. The city has three miles of water frontage which is lined with lumber yards, planing and shingle mills and other manufacturing establishments. It is the center of the redwood industry. Large quantities of lumber, butter and other products are shipped from here and the yearly average of exports amounts to about \$5,000,000. The city has broad, well paved streets, ample water supply, electric light and power and gas plants, daily papers, banks, an opera house and theaters. It has extensive tanneries and a large woolen mill. An electric railroad is in operation and is being extended. Population in 1910, 11,845.

**Eureka**, UTAH, a city in Juab co., 66 mi. s. of Salt Lake City, on the Rio Grande Western and the San Pedro, Los Angeles & Salt Lake railroads. It is a mining town and the center of the great Tintic mining district, which produces silver, gold and lead. Population in 1910 3416.

**Euripides**, *u rip'i deez* (about 480-406 B. C.), one of the three great tragic poets of Greece. He studied under Prodicus and Anaxagoras and is said to have begun to write tragedies at the age of eighteen, although his first play, the *Peliades*, did not appear until 455 B. C. He was not successful in gaining the first prize in the dramatic competition until the year 441 B. C., and he continued to exhibit till 408 B. C., when he presented the *Orestes*. Euripides is a master of tragic

situations and pathos, and shows much knowledge of human nature and skill in grouping characters, but his works lack the artistic completeness and the sublime earnestness that characterize Aeschylus and Sophocles. As a representative of the new order which did not believe in the old gods of Greece, he had more interest in the thoughts and feelings of real persons than in the experiences of the persons in old legends. His characters, it is true, were drawn from mythology, but they were presented as working out their own development, rather than as puppets of the higher powers. Euripides is said to have composed seventy-five, or, according to another authority, ninety-two tragedies. Of these, eighteen are extant, namely, *Alcestis*, *Medea*, *Hippolytus*, *Heeuba*, *Heraclidae*, *Supplices*, *Ion*, *Hercules Furens*, *Andromache*, *Troades*, *Electra*, *Helena*, *Iphigenia in Tauris*, *Orestes*, *Phoenissae*, *Bacchae*, *Iphigenia in Aulis* and *Cyclops*.

**Euro'pa**, in Greek mythology, the daughter of Agenor, king of the Phoenicians, and the sister of Cadmus. The fable relates that she was carried off by Jupiter, who for that occasion had assumed the form of a bull.

**Eur'ope**, the smallest of the grand divisions, lies between 71° 11' and 36° north latitude and between 9° 28' west longitude and 66° 20' east longitude. Its greatest length from north to south, between Cape North and Cape Matapan, is 2400 miles, and its greatest dimension east and west is from Ekaterinburg on the east to Cape Saint Vincent on the west, 3400 miles. The area, exclusive of islands, is about 3,560,000 square miles, or, including islands, 3,850,000 square miles. The coast line is very irregular and extended, being longer, in proportion to area, than that of any other grand division. Its length is variously estimated at from 20,000 to 48,000 miles. This variation is due to the method of measurement, the shorter line including only the large indentations, while the longer includes all of the smaller ones. Europe is bounded on the n. by the Arctic Ocean, on the e. by the Ural Mountains, Ural River and Caspian Sea, on the s. by Asia, the Black Sea and the Mediterranean and on the w. by the Atlantic and North Sea. The important coast waters are, on the north, the White Sea; on the east, the Caspian Sea; on the south, the Black Sea and Sea of Azov, the Bosphorus, Sea of Marmora, Dardanelles, Aegean Sea, Adriatic Sea, Gulf of Genoa, Gulf of Lyons and Strait of Gibraltar, and on the west, Bay of Biscay, English Channel,

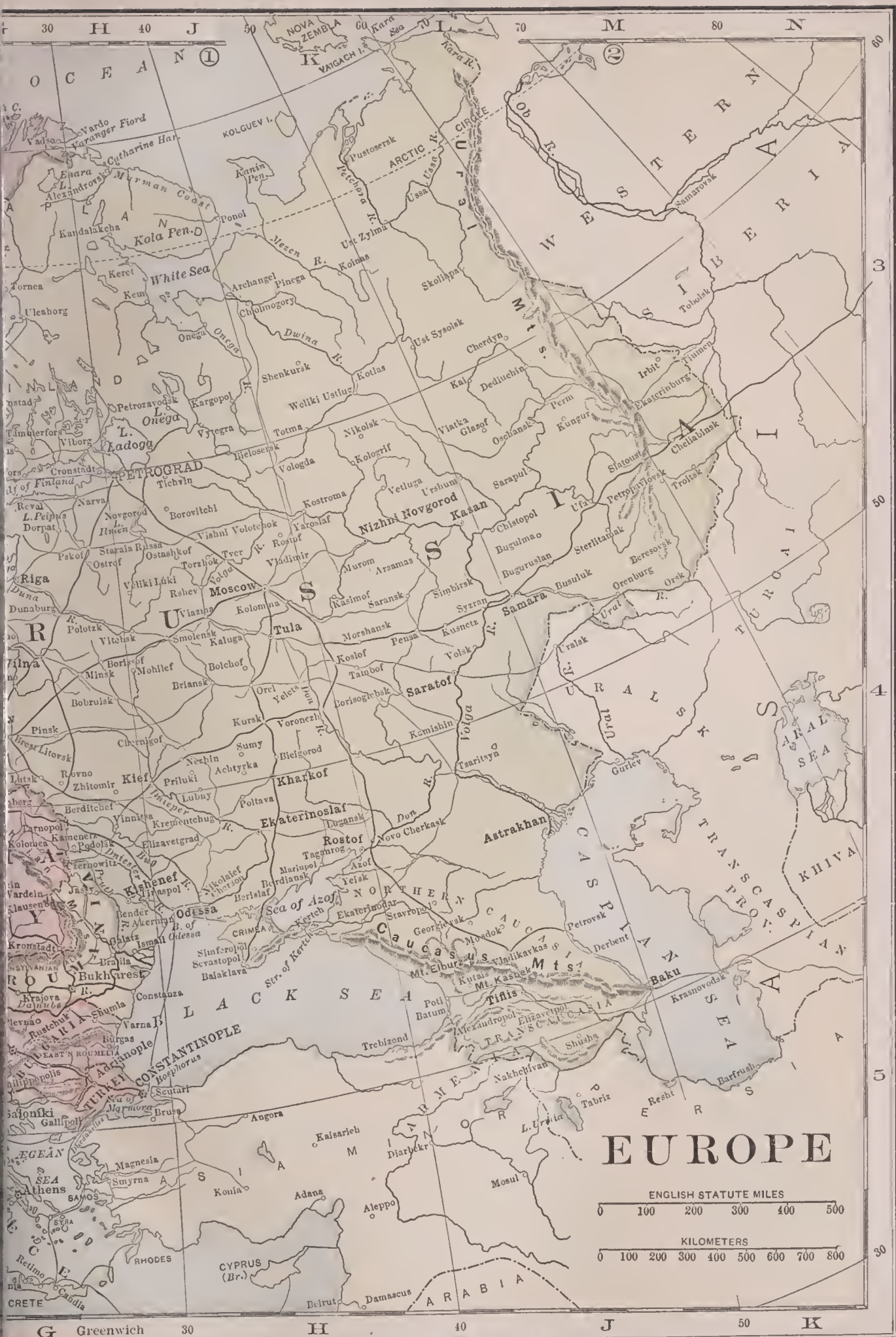






Hammond's 8 x 11 Map of Europe.  
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Corn



Wheat



Millet



Rye



Fir  
Foliage and Cone



Almond  
Nut and Flower



Madder



Orange



Fig



Olive



Strait of Dover, North Sea, Baltic Sea, Gulf of Bothnia and Gulf of Finland. The Baltic Sea is connected with the North Sea by the Skagerrak and Cattegat. The continent contains a number of important projections. On the west there are the Scandinavian peninsula and Denmark; on the south, Spain, Italy and the Balkan peninsula, containing Turkey and Greece. The surrounding islands of importance are, on the north, Nova Zembla and Kolguev; on the west, the Lofodens, Faroe, Shetland, Orkney, Hebrides and British Isles, near the coast, and Iceland in mid-ocean. The important islands of the Mediterranean are the Balearic Isles, Corsica, Sardinia, Sicily, Crete and the numerous smaller groups in the Ionian and Aegean seas. Most of these islands are out-croppings of the projected mountain ranges, and between them and the continent the sea is comparatively shallow.

**SURFACE AND DRAINAGE.** Fully two-thirds of the continent is low land, the larger part of which is a continuation of the great Asiatic plain, which is broken only by the Ural Mountains and has its western terminus in the lowlands of the British Isles. With the exception of the Kjölén Mountains, or Scandinavian Alps, forming the western boundary of the peninsula of the same name, the northern part of the continent is all low, and the plain extending westward includes the northern part of Germany, most of Belgium, the Netherlands and the northern and western part of France. The highlands consist of the main highland region in the south, having the Alps for its center, and numerous lower ranges to the north, the Ural Mountains in the extreme northeast, and the Kjölén in the northwest. The southern highland district is by far the most important. This embraces the Alps and their neighboring ranges and attains its greatest height just north of the Italian peninsula, in Mont Blanc, Monte Rosa, Jungfrau and Matterhorn, with several other peaks, some of which exceed 15,000 feet in altitude. The greatest extent of these mountains is from east to west, and they have a length of nearly 700 miles. The plateau upon which they rest is crossed by minor ranges in various directions, and the southern spurs, namely, the Balkans, Apennines and Pyrenees, with their projections, form the nucleus of the respective peninsulas occupied by Turkey and Greece, Italy, and Spain and Portugal. The Alps are divided by natural passes into three divisions, the western, central and eastern, and through these and other passes means of communication between the north and south have

been maintained for centuries, while now in the neighborhood of three of them—Mount Cenis, Saint Gotthard and Simplon—railroad tunnels have pierced the mountains (See ALPS). North and east of the Alps are the Carpathians, the Jura, the Harz and other minor ranges, with an altitude seldom exceeding 6000 feet, but in a few cases reaching nearly 8000. Between these mountains and the Alps are the great valleys of the Danube and the Upper Rhine, while on the south, between the main range of the Alps and the Apennines, is the valley of the Po, and to the west the Rhone descends to the Mediterranean between the Alps and the eastern extremity of the range connecting the Pyrenees. While the connection of the Pyrenees with the Alps is not evident geographically, geologists generally consider them to form a part of the same mountain system, and these with their western extension, the Cantabrians, form a practically impassable barrier between the Spanish peninsula and the countries to the north. South of these the Sierra Nevada and their branches give the peninsula its rugged and mountainous surface.

**Rivers and Lakes.** The main European watershed runs in a winding direction from southwest to northeast. At its northeastern extremity it is of very slight elevation. From the Alps descend some of the largest of the European rivers, the Rhine, the Rhone and the Po, while the Danube, a still greater stream, rises in the Black Forest north of the Alps. The Volga, which enters the Caspian Sea, an inland sheet without outlet, is the longest of European rivers, having a direct length of nearly 1700 miles, and, including windings, 2400 miles. Into the Mediterranean flow the Ebro, the Rhone and the Po; into the Black Sea, the Danube, the Dnieper, the Dniester and the Don; into the Atlantic, the Guadalquivir, the Guadiana, the Tagus and the Loire; into the English Channel, the Seine; into the North Sea, the Rhine and the Elbe; into the Baltic, the Oder, the Vistula and the Duna; into the Arctic Ocean, the Dvina. The lakes of Europe may be divided into two groups, the southern and the northern. The former run along both sides of the Alps, and among them, on the north side, are the lakes of Geneva, Neuchâtel, Thun, Lucerne, Zürich and Constance; on the south side, Lago Maggiore and the lakes of Como, Lugano, Iseo and Garda. The northern lakes extend across Sweden from west to east, and on the east side of the Baltic a number of lakes, stretching in the same direction across Finland on the borders





Ermine  
In his winter coat



Beaver



Brown Bear



Scandinavian Reindeer



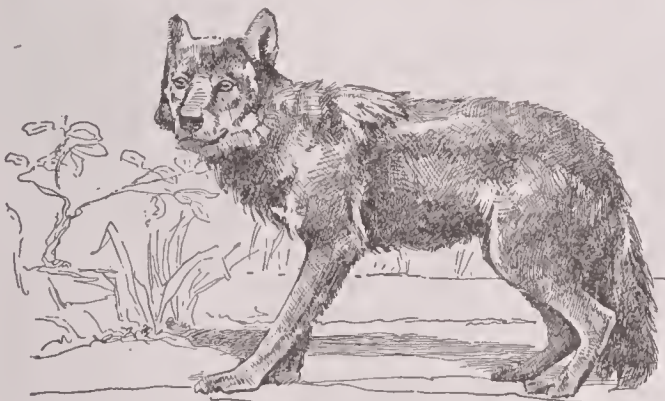
Owl



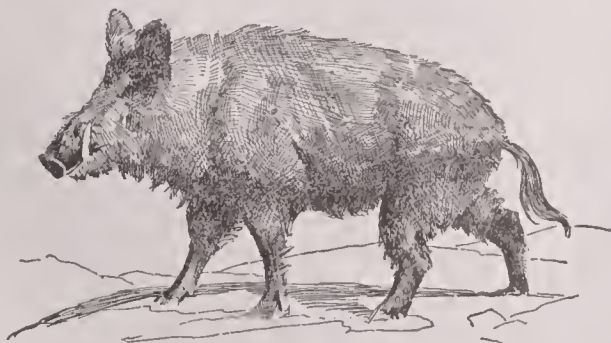
Mole



Goat



Russian Wolf



Wild Boar



Alpine Ibex



of Russia, mark the continuation of the line of depression. It is in Russia that the largest European lakes are found—lakes Ladoga and Onega.

**MINERAL RESOURCES.** Europe possesses abundant stores of those minerals which are of the most importance to man. Coal and iron are found all through the central portion of the highland region, between the fortieth and sixtieth parallels of latitude, and are of sufficient abundance to be profitably worked in Norway, Sweden, Belgium, Germany, France and the British Isles. The Scandinavian peninsula also contains rich silver ore; valuable deposits of quicksilver are found in the Harz Mountains and in Spain, while in the Ural Mountains are stores of copper and platinum. Tin occurs in Great Britain and in Brittany. Italy abounds in marble of excellent quality, and nearly all of the mountainous countries contain extensive quarries of granite, limestone and other building material, while in many localities are clays valuable for the manufacture of brick and pottery.

**CLIMATE.** Several circumstances concur to give Europe a climate peculiarly genial, such as its position almost wholly within the temperate zone and the great extent of its coast waters. Much benefit is derived also from the fact that its shores are exposed to the warm marine currents and warm winds from the southwest, which prevent the formation of ice on most of its northern shores. The eastern portion has a less favorable climate than the western. The extremes of temperature are greater, the summer being hotter and the winter colder, while the lines of equal mean temperature decline south as they go east. The same advantages of mild and genial temperature which western Europe has over eastern Europe, the continent as a whole has over the rest of the Old World. The diminution of mean temperature, as well as the intensity of the opposite seasons, increases as we go east. Peking, in latitude 40° north, has as severe a winter as Saint Petersburg, in latitude 60°. Throughout the continent there is sufficient rainfall for agriculture, and there are no desert areas.

**VEGETATION.** With respect to the vegetable kingdom Europe may be divided into four zones. The first, or most northern, is that of fir and birch. The birch reaches almost to North Cape; the fir ceases a degree farther south. The cultivation of grain extends farther north than might be supposed. Barley ripens even under the 70th parallel of north latitude; wheat ceases at 64° in Norway, 62° in Sweden. Within this

zone, the southern limit of which extends from latitude 64° in Norway to latitude 62° in Russia, agriculture has little importance, the inhabitants being chiefly occupied with the care of reindeer or cattle, and in fishing. The next zone, which may be called that of the oak and beech and cereal produce, extends from the limit above mentioned to the 48th parallel. The Alps, though beyond the limit, by reason of their elevation, belong to this zone, in the more moist parts of which cattle husbandry has been brought to perfection. Next is the zone of the chestnut and vine, occupying the space between the 48th parallel and the mountain chains of southern Europe. Here the oak still flourishes, but the pine species become rarer. Rye, which characterizes the preceding zone on the continent, gives way to wheat, and in the southern portion of it to maize, also. The fourth zone, comprehending the southern peninsulas, is that of the olive and evergreen woods. The orange flourishes in the southern portion and rice is cultivated in a few spots in Italy and Spain. See full page plate, *Plants of Europe*.

**ANIMAL LIFE.** The reindeer and polar bears are peculiar to the north. Bears and wolves still inhabit the forests and mountains; but, in general, cultivation and population have expelled wild animals. The domesticated animals are nearly the same throughout the continent. The ass and mule lose their size and beauty north of the Pyrenees and Alps. The Mediterranean Sea has many species of fish, but no great fishery; the northern seas, on the other hand, are annually filled with countless shoals of a few species, chiefly the herring, mackerel, cod and salmon. See full page plate, *Animals of Europe*.

**INHABITANTS.** Europe is occupied by several different peoples or races, in many parts now greatly intermingled. The Celts once possessed the west of Europe from the Alps to the British Islands. But the Celtic nationalities were broken by the wave of Roman conquest, and the succeeding invasions of the Germanic tribes completed their political ruin. At the present day the Celtic language (See CELTS) is spoken only in the Scotch Highlands (Gaelic), in some parts of Ireland (Irish), in Wales (Cymric) and in Brittany (Armorican). Next to the Celtic comes the Teutonic race, comprehending the Germanic and Scandinavian branches. The former includes the Germans, the Dutch and the English. The Scandinavians are divided into Danes, Swedes and Norwegians. To the east of the Teutonic race, though sometimes mixed with





DAVID. Michelangelo



VICTORY OF SAMOTHRACE



JULIUS CAESAR



VENUS OF MILO



LAST DAY OF NAPOLEON. Vela



DISCOBOLUS OF NAUCYDES



DETAIL FROM THE FRIEZE OF THE PARTHENON. Praxiteles



## Europe

it, come the Slavonians, that is, the Russians, the Poles, the Czechs or Bohemians, the Servians, Croatians and a few others of lesser importance. In the south and southeast of Europe are the Greek and Latin peoples, the latter comprising the Italians, French, Spanish and Portuguese. All the above peoples are regarded as belonging to the Indo-European, or Aryan, stock. To the Mongolian stock belong the Turks, Finns, Lapps and Magyars, or Hungarians, all immigrants into Europe in comparatively recent times. The Basques, at the western extremity of the Pyrenees, are a people whose affinities have not been determined (See BASQUE). The total population of Europe is about 390,000,000. The prevailing religion is the Christian, embracing the Roman Catholic Church, which is the most numerous, the various sects of Protestants—Lutheran, Calvinistic, Anglican, Baptists, Methodists—and the Greek Church. A part of the inhabitants profess the Jewish, a part the Mohammedan, religion.

**POLITICAL DIVISIONS.** The independent states of Europe are as follows: Andorra, Austria-Hungary, Belgium, Bulgaria, Denmark, France, Germany, Great Britain, Greece, Italy, Liechtenstein, Luxemburg, Monaco, Montenegro, the Netherlands, Norway, Portugal, Rumania, Russia, San Marino, Servia, Spain, Sweden, Switzerland and Turkey.

**HISTORY.** Europe was probably first peopled from Asia. The first authentic history begins in Greece at about 776 B. C. Greek civilization was at its most flourishing period about 430 B. C. After Greece came Rome, which, by the early part of the Christian era, had conquered Spain, Greece, Gaul, Helvetia, Germany between the Danube and the Alps, Illyria, Dacia and a few other regions. Improved laws and superior arts of life spread with the Roman Empire throughout Europe, and the unity of government was also extremely favorable to the extension of Christianity. With the decline of the Roman Empire a great change in the political constitution of Europe was produced by the universal migration of the northern nations. The Ostrogoths and Lombards settled in Italy, the Franks in France, the Visigoths in Spain and the Anglo-Saxons in South Britain, reducing the inhabitants to subjection or becoming incorporated with them. Under Charlemagne (771–814) a great Germanic empire was established, so extensive that the kingdoms of France, Germany, Italy, Burgundy, Lorraine and Navarre were afterward formed out of it. About this time the north-

## Eusebius of Caesarea

ern and eastern nations of Europe began to exert an influence in the affairs of the continent. The Slavs, or Slavonians, founded kingdoms in Bohemia, Poland, Russia and the north of Germany; the Magyars appeared in Hungary, and the Normans agitated all Europe, founding kingdoms and principalities in England, France, Sicily and the East. The Crusades and the growth of the Ottoman power are among the principal events which influenced Europe from the twelfth to the fifteenth century (See CRUSADES; TURKEY). The conquest of Constantinople by the Turks (1453), by driving the learned Greeks from this city, gave a new impulse to letters in western Europe, which was carried onward by the Reformation and the invention of printing (See PRINTING; REFORMATION). The discovery of America was followed by the temporary preponderance of Spain, then of France, in Europe. Subsequently, Prussia and Russia gradually increased in territory and strength. The French Revolution (1789) and the Napoleonic wars had a profound effect on Europe, the dissolution of the old German Empire being one of the results. Since then the most important events in European history have been the establishment of the independence of Greece; the disappearance of Poland as a separate state; the unification of Italy under Victor Emmanuel; the Franco-German War, resulting in the consolidation of Germany into an empire under the leadership of Prussia; the partial dismemberment of the Turkish Empire and the war between Turkey and Greece (1897); the Spanish-American War (1898), which deprived Spain of her chief colonies; the Anglo-Boer War (1899), which strengthened Great Britain's hold upon Southern Africa; the Russo-Japanese War (1904) which deprived Russia of her supremacy in the Far East; the Turko-Italian War (1911-1912), by which Italy gained possession of Tripoli, and the Turko-Balkan War (1913), which left Turkey no territory in Europe except Constantinople. For fuller details, see articles on the different political divisions, sub-head *History*.

**Eusebius of Caesarea** (about 260—about 340), a famous Church historian. He was forced during persecution under Maximinus to flee for his life to Egypt, but returned, and in 313 was made bishop of Caesarea. During the Council of Nice, he led the moderate party of the Arians. The emperor Constantine was the friend and admirer of Eusebius. Among the works of Eusebius are *History of the World to*

*the Time of Constantine*, a work which contained extracts from heathen authors whose teaching Eusebius believed led up to that of Christianity; and a history of the Christian Church to 324.

**Eustachio**, *a oos tah'ke o*, BARTOLOMMEO (?-1574), an Italian surgeon, whose discoveries in anatomy made him famous. To him anatomists are indebted, among other things, for the first accurate knowledge of the internal ear and its structure, of the development of the teeth and of the structure of the kidneys.

**Eus'tis**, JAMES BIDDLE (1834-1899), an American lawyer and statesman. He graduated at Harvard Law School in 1854 and practiced law until the war broke out. As judge advocate he served on the staffs of the Confederate generals Magruder and Johnston, till the close of the war. He was twice United States senator and later minister to France.

**Eustis**, WILLIAM (1753-1825), an American physician and politician, born at Cambridge, Mass., and educated at Harvard University. He served in the Revolutionary War as a surgeon and later was elected to Congress by the Anti-Federalists, serving two terms. From 1809 to 1813 he was secretary of war and for four years was minister to Holland. On his return he again entered Congress and from 1823 until his death was governor of Massachusetts.

**Eu'taw Springs**, BATTLE OF, an important battle of the American Revolution, fought September 8, 1781, about 60 mi. n. w. of Charleston, S. C., between an American force of 2000 under General Greene and about an equal British force under General Stuart. The battle began about 4 A. M. in an engagement in which the Americans were victorious; but later in the day the British rallied and held their ground. However, after the fight they retreated toward Charleston. This battle closed Greene's famous campaign in the South, by which he compelled the enemy to retire to Charleston, there to remain during the rest of the struggle.

**Euterpe**, *u tur'pe*, in classical mythology, the Muse who presided over lyric poetry. The invention of the flute was ascribed to her, and she was usually represented as a virgin crowned with flowers, holding a flute in her hand.

**Evangelical**, *e van jel'i kal*, **Alliance**, an association of the members of various evangelical denominations throughout the United States and Europe, for the purpose of unifying the efforts of Christian churches and extending the Christian faith. The alliance was organized in

London in 1846 and includes Baptists, Independents, Lutherans, Methodists, Moravians, Presbyterians, the Reformed Church and a few other denominations. The countries represented are England, France, Germany, Ireland, Scotland, Switzerland and the United States. Branches are also found in many of the British colonies. The American branch was organized in 1867. International conferences are held at intervals of from two to four years. The most important work accomplished by this organization has been the promotion of religious liberty and the assistance it has given to the setting aside of denominational barriers and the bringing of various evangelical churches together on lines of work in which all Christian people are generally interested.

**Evangelical Association**, a religious denomination, formed among the Germans in Pennsylvania in 1807. In its doctrines and church polity it very closely resembles the Methodist Episcopal Church. Owing to a difference of opinion in regard to methods of management, the organization divided in 1891, one branch being known as the United Evangelical Church and the other as the Evangelical Association. A large proportion of the followers are of German extraction, though there is a considerable English-speaking membership. Besides the conferences in the United States there are conferences in Germany, Switzerland and Japan. Its publications are issued in both the English and German languages.

**Ev'ans**, MARY ANN or MARIAN. See ELIOT, GEORGE.

**Evans**, ROBLEY DUNGLISON (1846-1912), an American naval officer, born in Virginia and educated at the United States Naval Academy at Annapolis. During the Civil War he was present at both attacks on Fort Fisher, and in the second he was wounded. Returning to the service in 1866, he occupied various positions until 1896, when he was put in command of the *Indiana*. During the Spanish-American War he commanded the *Iowa* and took a prominent part in the capture of the Spanish fleet off Santiago. In 1901 he was made rear admiral.

**Ev'anston**, ILL., a city in Cook co., on Lake Michigan, just north of the limits of Chicago and 12 mi. from the center of the city. It is on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads, and it also has electric railway connection with Chicago and the many towns to the north along the lake shore. The city is beautifully located and is



exclusively a residence place, being practically a suburb of Chicago. It was the home of Miss Frances Willard. Northwestern University, Garrett Biblical Institute, the Norwegian-Danish Theological School, Swedish Theological Seminary and Visitation Academy are located here. Evanston was settled about 1835 and was incorporated in 1890. Population in 1910, 24,978.

**Evanston, Wyo.**, the county-seat of Uinta co., in the southwestern part of the state, on the Bear River and on the Union Pacific railroad. The city is in a stock-raising and coal-mining section. Oil is found in the vicinity, and the industries include railroad shops and flour and lumber mills. The state institution for the insane is located here. Population in 1910, 2583.

**Evansville, IND.**, the county-seat of Vanderburg co., on the Ohio River, 180 mi. s. w. of Indianapolis, on the Illinois Central, the Louisville & Nashville, the Southern, the Evansville & Terre Haute and other railroads. Prominent buildings are the city hall, the courthouse, the customhouse, Evans Hall, the state hospital for the insane and the United States marine hospital. Lumber milling is the chief industry, and the city is one of the greatest hardwood lumber markets in the world. There are steel works and numerous other factories, producing harness, saddlery, engines, boilers, furniture, flour, liquors, chemicals and other goods, and there is also a valuable trade in coal, grain, tobacco and flour. Evansville became the county-seat in 1819 and was chartered as a city in 1847. Population in 1910, 69,647.

**Evap'ora'tion**, the conversion of a liquid or solid by heat into vapor or steam, which becomes dissipated in the atmosphere. The process of evaporation is constantly going on at the surface of the earth, but principally at the surface of the sea and of lakes, rivers and pools. The vapor thus formed, being specifically lighter than atmospheric air, rises to considerable heights above the earth's surface; and afterward, by a partial condensation, forms clouds and finally descends in rain. As heat is required to produce evaporation, the process is a cooling one to the atmosphere. Different liquids vary in the rapidity of their evaporation, and the rate is modified, too, by the character of the vessel in which the liquid is placed, as well as by other causes.

**Ev'arts, WILLIAM MAXWELL** (1818-1901), an American lawyer and statesman, born in Boston.

He graduated at Yale in 1837, studied law at Harvard and was admitted to the bar in New York City in 1841. He was assistant district attorney in New York City and rose rapidly in his profession, being made counsel for President Johnson in the impeachment trial and leading counsel for the United States in the Alabama Claims controversy. In the Hayes-Tilden contest he managed the case for Hayes before the commission and was made by him secretary of state. Evarts was elected to the United States Senate in 1885, serving until 1891, when he retired to private life.

**Ev'elet'h, MINN.**, a town of Saint Louis co., on the Duluth & Iron Range and the Duluth, Missabe & Northern railroads, 71 mi. n. n. w. of Duluth. The surrounding district yields much iron, and Eveleth has interests connected with the iron industries. Population in 1910, 7036.

**E'vening Schools.** The European evening schools were probably the outgrowth of Sunday schools which, about the middle of the eighteenth century, added to their religious teaching instruction in the common branches. In most European countries at that time education was not compulsory, and these night schools enabled many children to obtain an education of which they would otherwise have been deprived. Night schools are now maintained in Germany, Switzerland and Great Britain at the expense of the State and are open to pupils of both sexes.

The evening schools in the United States began about 1850, and they now form a part of the educational system of nearly all large cities. Their sessions usually continue from November to March. Pupils are admitted without regard to age, nationality or previous education. The methods of instruction and subjects taught often differ widely from those in the day schools. Many pupils are foreigners and attend for the purpose of learning English. Newspapers are often used in the place of text-books, and in the best schools the greatest freedom is maintained between teachers and pupils. The purpose is to adapt the teaching to the needs of the individual pupil and to enable him, during the time that he can attend the school, to obtain the greatest possible benefit. Arithmetic, writing, English, other common branches and commercial branches are taught. In large cities special institutions, such as the Drexel Institute in Philadelphia and Cooper Union in New York, maintain evening classes, in which instruction of a high order is given. The Young Men's Christian Association

also maintains evening schools in most of the large cities. In these all branches are taught, from the most elementary to those required for a college degree.

**Evening Star** or **Hesperus**, the name given to the planet Venus when visible in the evening. See VENUS.

**Ev'crest**, MOUNT, a mountain of the Himalayas, the highest known summit in the world, being about 29,000 feet high. It received its name from Sir George Everest, a surveyor-general of India.

**Ev'rett**, MASS., a city in Middlesex co., 3 mi. n. of Boston, on the Boston & Maine railroad and connected by electric railways with the neighboring towns. It is primarily a residence place, but it also has a number of manufacturing plants, including chemical, gas and coke works, and iron, steel and woolen mills. The city contains the Parlin and Shute libraries and Whidden Hospital. Everett was settled in 1643, but remained a part of Malden until 1870. Population in 1910, 33,484.

**Everett**, WASH., the county-seat of Snohomish co., 33 mi. n. of Seattle, on Puget Sound and on the Northern Pacific, the Great Northern and a branch of the Chicago, Milwaukee & Puget Sound railroads. The city has an excellent harbor and is in a productive agricultural, lumbering and mining region. There are railroad shops, shipyards, iron works, paper mills, large sawmills, a smelter and many other establishments. Everett was settled in 1891, was incorporated two years later and has experienced a rapid growth on account of its natural advantages. It has a public library, United States customs and assayer's offices, a theater, a hospital and many well-constructed brick buildings. Population in 1900, 7838; in 1910, 24,814.

**Everett**, EDWARD (1794-1865), an American statesman and author, born at Dorchester, Mass., educated in Boston and at Harvard College. He entered the Unitarian ministry, but resigned in 1815 and traveled in Germany and England, returning in 1819 to occupy the chair of Greek literature at Harvard. He became editor of the *North American Review* and, entering politics, became successively member of Congress, governor of Massachusetts and minister plenipotentiary to England. In 1845 he was appointed president of Harvard College and in 1852 became secretary of state. He was then elected United States senator as a conservative Whig, but resigned in 1854. In 1860 Everett was nominated for vice-president by the Constitutional Union

party and received 39 electoral votes. Shortly after, he retired to private life. He is considered one of the greatest American orators.

**Everglades**, *ev'ur glaydz*, a low, marshy tract of country in southern Florida, inundated with water and interspersed with low islands, covered with high grass and trees. The swamp is 140 miles long and 50 miles broad.

**Ev'ergreen**, a name given somewhat carelessly to any plant that retains its leaves throughout all seasons, but more especially to trees and shrubs of the pine family (See CONIFERAE). As a matter of fact evergreens shed their old leaves annually, but not until after the new foliage has been formed, so that the change is not noticeable.

**Everlasting Flower**, a name given to a number of different species, all of which can be kept for an indefinite time without losing their color or form. See IMMORTELLE.

**Ev'idence**, in law, any means by which the truth or falsity of a fact relevant to an action at law is established. Certain principles have become well established regarding the introduction of evidence:

1. It must be relevant to the question at issue; that is, it must directly or indirectly tend to prove or disprove a fact set up by either party to the controversy. However, if its bearing is too remote it is generally excluded.

2. No evidence which is not known to the witness can be given by him, that is, he cannot offer hearsay evidence—statements made by others, of the truth of which he has no certain knowledge. There are, however, exceptions to this rule: (a) Written statements or confessions of a party to a case may be introduced against him, on the principle that they are probably true if they are opposed to his interests; (b) officially reported testimony in a prior case over the same question may be admitted; (c) the declarations made by a person who is dying or believes himself to be dying may be introduced in murder trials; (d) entries in books or memorandums made in the usual course of a business transaction, by one who afterward died and who had personal knowledge of the matter which he recorded, may be admitted, provided that such a record was made in pursuance of duty; thus, a diary entry would not be admissible; (e) statements by persons present at a certain event may be introduced to prove incidents connected with the event.

3. Evidence may consist of other things than the sworn testimony of witnesses; as, parts of clothing, weapons or machinery, finger prints



or documents. However, it is always necessary to introduce other evidence to identify the objects offered as evidence.

4. Oral evidence cannot as a rule be introduced to contradict the statements in a written instrument or contract. There are, however, exceptions to this rule; for instance, where the parties to the contract did not originally agree to place all the conditions of the contract in writing, or where there is a subsequent oral agreement between the parties or where it is sought to prove that the contract is not in force because of the non-performance of an agreed condition.

5. Witnesses can testify as to facts only, and are not allowed to give opinions or inferences, the natural consequences of the facts being left to the jury for determination.

6. A witness cannot testify unless he is under oath to speak the truth. He need not give any testimony which tends to incriminate himself. However, if he chooses to do so, the evidence is competent and, having waived his privilege, the witness must testify fully.

7. In the examination of witnesses, an attorney cannot ask his own witness, that is, a witness called in the behalf of his client, leading questions, that is, questions which indicate the answer which is desired. At the close of the direct examination the counsel for the opposing side may cross-examine the witness. In this examination he may ask leading questions and may ask, also, questions irrelevant to the exact point at issue, in order to impeach the credibility of the witness. However, the witness may refuse to answer such questions.

The burden of proving any fact set up in a trial rests with the party asserting that fact and must be sustained by a preponderance of evidence. Thus, in criminal trials the burden of proof is with the prosecution, which must prove its accusations beyond any reasonable doubt. A few facts in a case of this sort need not be proven, since the court will take notice of them of its own will. This is known as *judicial notice*. Among such facts are those of common and universal knowledge, such as the calendar or multiplication table, and facts which are presumed to follow from certain other facts. See ACTION; COURTS; JURY AND TRIAL BY JURY; LAW; PROCEDURE; WITNESS.

**Ev'olu'tion**, a term used to indicate the process of growth by which any race, genus or species of living things becomes superior or inferior to those from which it sprung. While evolution in its broadest sense applies to all lines of devel-

opment, in its ordinary use the term is restricted to the biological sciences. Evolution differs from development in having a broader application. Development applies to what transpires in the case of an individual, while evolution applies to the development of a race. The general theory of evolution is that whatever now exists has descended naturally from what existed in the past, and that nothing new is created; that all of the different forms of life which we see about us have been descended in the process of time from simpler forms, and that these in turn came from still less complex ancestors, so that the line of descent extends backward till it is lost in the beginnings of things. Scientific evolution does not pretend to account for the origin of things. It assumes their creation and accounts for what occurs afterward.

Evolution is based upon evidence found in plants and animals now existing and upon that obtained through the study of geology. Nearly all are familiar with certain changes that take place in the structure of plants and animals from one generation to another, and those engaged in breeding plants and domestic animals use this knowledge in the production of new varieties and in the perfection of varieties already existing. The geologist is able to show us extinct forms of life which served to bridge over the chasms between existing species and so increase the closeness of relationship. The student of zoölogy is aware of the strong resemblance in structure between reptiles and birds. The geologist shows forms which indicate that the earliest birds were winged reptiles with feathers and with teeth. This fact clearly understood, it is easy to believe that the birds now existing may have sprung from reptiles in a period long before the existence of man upon the earth.

When first advanced, the doctrine of evolution was strongly opposed by many who failed to grasp the fundamental idea in the theory and believed that it tended to atheism; but with better acquaintance with the facts, the application of the theory to the development of life was seen to be amply substantiated, and under the leadership of Darwin, Herbert Spencer and others it became thoroughly established and at the present time is more generally accepted than ever before.

**Evolution**, in mathematics. See ROOT.

**Ewell**, *u'el*, RICHARD STODDERT (1817-1872), an American soldier, born in Washington, D. C., and educated at West Point. He served with distinction in the Mexican War, attaining the

rank of captain, and took part in indian campaigns in 1857. On the outbreak of the Civil War, he resigned from the Union army and entered the Confederate service. He was made major general, commanded a division at both battles of Bull Run and at Antietam, and after the death of "Stonewall" Jackson he commanded the latter's corps, with the rank of lieutenant general. He played an important part in the battles of Gettysburg and the Wilderness, but was captured with his entire force by Sheridan, April 6, 1865.

**Ew'ing**, THOMAS (1789-1871), an American statesman, born in Virginia. He graduated from the university at Athens, Ohio, studied law, and attained distinction at the bar. In 1831 he was elected to the United States Senate, retired at the close of his term, but in 1841 was appointed secretary of the treasury and was the first man to hold the office of secretary of the interior, to which he was appointed by Fillmore in 1849. He was regularly elected to the Senate in 1850 and held his seat one year. He ranked among the foremost lawyers of the nation.

**Exchange'**, in commerce, that species of transactions by which the debts of individuals residing at a distance are canceled by order, without the transmission of specie. Thus, a merchant in Chicago who owes \$500 for goods bought in New York, gives a bill, or order, for that amount, which can be offset through banking agencies, or otherwise, against similar debts owing by parties in New York to persons in Chicago. The creditor of Chicago is thus paid by the New York debtor and *vice versa*, and the expense and risk of transmitting money is thus obviated. The process of liquidating obligations between different nations is carried on in the same way, by an exchange of foreign bills. Exchange is said to be *at par* when a bill drawn in New York for the payment of £100 sterling in London can be purchased there for £100. If it can be purchased for less, exchange is said to be *under* or *below par* and is against London. If the purchaser is obliged to give more, exchange is *above par* and is in favor of London. Although the thousand circumstances which incessantly affect the value of money prevent the ordinary course of exchange from ever being precisely at par, its fluctuations are confined within narrow limits, and if direct exchange is unfavorable between two countries, this can often be obviated by the use of bills drawn on other countries where an opposite state of affairs prevails. See BILL OF EXCHANGE.

**Ex'cise Tax**, a tax upon commodities, usually levied at the time of selling or of bringing to market. It has been an essential feature of the English fiscal system for many years and under the name of *internal revenue* is familiar in America. It is usually and most satisfactorily applied to luxuries whose use is apt to become a vice, as liquors and tobacco. Though it has always been opposed wherever levied, on account of the severe measures taken to apprehend and punish evaders of the tax, it is generally considered the most productive and the least objectionable of all taxes. The first excise tax in American history was proposed by Alexander Hamilton in March, 1790, and was soon adopted. It resulted in the Whisky Insurrection in Pennsylvania in 1794 (See WHISKY INSURRECTION). At first laid only upon liquors, the need of revenue led to the imposition of the tax upon such common articles as carriages, sugar, licenses and some legal instruments.

The Democratic party, which came into power in 1801, abolished all excise taxes and has ever since resolutely opposed the excise as a form of sumptuary legislation (See SUMPTUARY LAWS). However, an excise law was found necessary during the War of 1812, but was repealed in 1817. No further legislation of this kind was passed until the opening of the Civil War, when the most comprehensive law yet enforced was enacted by the United States Congress. Rhodes has said it might be called, with a fair degree of accuracy, "a law that taxed everything." The rates were increased step by step as the demands for revenue increased, but after the close of the war the taxes were gradually repealed and the rates of those remaining were lowered. After 1870 few changes were made until the outbreak of the Spanish-American War, when taxes were again imposed upon numerous articles, especially proprietary articles, and the tax on liquors and tobacco was doubled. With the return of peace, the law was again repealed, the last vestige of the war tax being abolished by March, 1902. See TAX.

**Excre'tions**. See SECRETIONS; SWEAT; URINE.

**Exec'utive**, that branch of the government of a country by which the laws are carried into effect or the enforcement of them superintended. The term is used in distinction from the *legislative* and the *judicial* departments, and it includes the supreme magistrate, whether emperor, king, president or governor, his cabinet, or ministers, and a host of minor officials.



**Exec'utor**, in law, one appointed by a person's last will to carry its provisions into execution after the testator's death. The testator may, by the common law, appoint any person of sound mind and discretion, though otherwise under some legal disabilities as to contracting and transacting business in general, such as a married woman or a minor. The duties of executors and of administrators are, in general, the same, the difference of the two depending mostly on the mode of appointment, the executor being nominated by the testator, the administrator being appointed by the judge of probate. An executor is liable for any loss occurring to the estate through negligence, or for paying legatees before all debts are discharged. See WILL; DESCENT.

**Ex'eter**, a city, port and Parliamentary and municipal borough of England, in the County of Devon, on the left bank of the Exe, 10 mi. n. w. of its mouth, 170 mi. w. s. w. of London. Its chief building is the cathedral, founded in 1112, celebrated for its beauty of architecture and for its unique transept towers, which are the only towers of the kind in England. The cathedral measures 408 feet in length and 140 feet in width. Other ancient buildings are the Guild Hall, dating from the fifteenth century; remains of the castle of Rougemont; the Albert Memorial Museum; Saint John's Hospital; Victoria Hall, and Saint Michael's Church. Exeter has iron foundries and manufactories of agricultural implements and paper mills, and it is the center of the Honiton lace trade. The city is the oldest continuously inhabited city of England. It was a British settlement long before the invasion of the Romans, under whom it was known as Isca Damnoniorum. Population in 1911, 48,660.

• **Exhibition**, *eks'hy bish'un*, INDUSTRIAL, an exhibition of works of industry and art, for the purpose of exciting public interest and promoting trade and manufactures. In 1798 an industrial exhibition of the products of French industry was held at Paris and proved so successful that in 1802, during the consulate of Napoleon, another was held, and a series of them was held at intervals, the eleventh, and last, at Paris in 1849. In Britain, exhibitions of a local nature were held in Dublin, Manchester, Liverpool and Birmingham, and annually in London. In 1855 the first French Exposition Universelle was opened in Paris. The buildings were erected in the Champs Elysées and covered about twenty-four acres. There were in all about

24,000 exhibitors. This was followed in 1862 by the great international exhibition held in London, at which the famous Crystal Palace was erected. The second French international exhibition was opened in April, 1867. It was erected on the Champ de Mars and covered about thirty-seven acres. The exhibitors numbered nearly 50,000, the visitors about 10,000,000. A great exhibition was held at Philadelphia in 1876 upon the occasion of the centennial festival of the American Declaration of Independence. It occupied 60 acres and had nearly 10,000,000 visitors. A third French international exhibition was held at Paris in 1878, the area occupied amounting in all to 140 acres, the visitors numbering about 17,000,000. A fourth was held in 1889, partly intended to commemorate the centenary of the French Revolution. One of the features in connection with it was the famous Eiffel Tower of iron. In 1883 a series of exhibitions began at South Kensington, London, where the exhibits were confined to articles having relation to a special department. In 1893 an international exhibition of majestic proportions was held in Chicago, Ill., to commemorate the four hundredth anniversary of the discovery of America. In 1900 an international exhibition was held in Paris, and in 1904 an exhibition commemorating the Louisiana Purchase was opened at Saint Louis. In America, in recent years, there have been numerous smaller exhibitions for special purposes, notably those at San Francisco, Cal., Atlanta, Ga., Nashville, Tenn., Omaha, Neb., Buffalo, N. Y., Charleston, S. C., and Portland, Ore. See CENTENNIAL EXPOSITION; LOUISIANA PURCHASE EXPOSITION; LEWIS AND CLARK EXPOSITION; SOUTH CAROLINA EXPOSITION; PAN-AMERICAN EXPOSITION; WORLD'S COLUMBIAN EXPOSITION; TRANS-MISSISSIPPI EXPOSITION; ALASKA-YUKON-PACIFIC EXPOSITION.

**Exogenous**, *eks oj'e nus*, **Plants**, formerly the name of a primary class of plants, now called *dicotyledons*. See BOTANY.

**Exorcism**, *eks'or siz'm*, the casting out of evil spirits by certain forms of words or ceremonies. An opinion prevailed in the ancient Church that certain persons, particularly those who were afflicted with madness or epilepsy, were possessed by evil spirits. Over such persons forms of conjuration were pronounced, and this act was called exorcism. There were even certain men who made this a regular profession and were called exorcists. Exorcism still forms a part of the beliefs of some churches.

## Expansion

**Expan'sion**, in physics, the enlargement or increase in the bulk of bodies, in consequence of a change in their temperature. This is one of the most general effects of heat, being common to all bodies whatever, whether solid or fluid. The expansion of fluids varies considerably, but, in general, the denser the fluid the less the expansion; thus, water expands more than mercury and spirits of wine more than water. Commonly, also, the greater the heat, the greater is the expansion; but this is not universal, for there are cases in which expansion is produced, not by an increase, but by a diminution of temperature. Water, in cooling, ceases to contract at 42° F., and it has its maximum density at 39.2° F. Just before it reaches the freezing point, 32°, it begins to expand again and expands more and more rapidly as the freezing point is reached. This expansion is about one-eleventh of its bulk, and accounts for the bursting of pipes and other vessels when water freezes in them.

**Expansion**, TERRITORIAL, OF THE UNITED STATES. See UNITED STATES, subhead *History*.

**Ex'pecta'tion**, the value of the prospect of gaining some prize or property depending upon the happening of an uncertain event. A sum of money in *expectation* upon a certain event has a determinate value before that event happens. If the chances of receiving or not receiving a hundred dollars, when an event arrives, are equal, then, before the arrival of the event the expectation is worth half the money. *Expectation of life* is the probable duration of the life of individuals of any given age. A rough estimate of any one's expectation of life is made by calculating two-thirds of the difference between his or her present age and eighty.

**Explo'sion**, a sudden bursting, generally due to the rapid production of gaseous matter from solids or liquids. Thus, the explosion of gunpowder is due to the sudden formation and expansion of gases into which the powder is converted by chemical agency. Explosions are often caused by the elastic force of confined steam.

**Expo'nent**, in algebra. See POWER, in mathematics.

**Ex Post Fac'to** (Latin, "from something done afterward"), in law, something done after and bearing upon something previously done; thus, a law is said to be *ex post facto*, or retroactive, when it is enacted to punish an offense committed before the passing of the law.

## Extradition

**Express' Company**, a company or association which transports parcels for hire. This business began in the custom of stage drivers of carrying packages from one point in their route to another, for a small consideration, but it was first introduced as a separate business in 1839 by William F. Harnden. It soon grew to immense proportions and has extended its field to cover, besides the delivery of parcels, the issuance of checks, or money orders, similar to the postal money orders (See POSTOFFICE), the collection of debts and even the acceptance of deposits for safe keeping. By means of C. O. D. methods, that is, collection on delivery, goods are transported for merchants and delivered to consumers upon payment of the purchase price. The use of express money orders, or letters of credit, in foreign travel is becoming more common, perhaps, than any other means of carrying funds. In Europe the express business is generally transacted by the postoffice departments of the governments.

**Exten'sion**, in physics, that property of matter by which it occupies a portion of space. Extension is a general property of matter, for it is impossible to conceive of matter, even in the minutest portion, without connecting with it the idea of its having a certain bulk and occupying a certain quantity of space. The dimensions of a body are length, breadth and thickness, and all bodies occupying space have these three dimensions. However, at first thought we are liable to attribute only length and breadth to such bodies as a piece of tissue paper or of gold leaf. But this is not correct, for, unless these bodies did possess thickness or depth, they could not exist as material objects.

**Ex'tract**, a term used to denote all that can be dissolved out of a substance by a specified menstruum, such as water, alcohol or ether. In modern pharmacy the term is applied to two kinds of preparation from vegetables. One is obtained by digesting the plant in water or other solvent and evaporating or distilling away the liquid, until the extracted matter is sufficiently dry. The other is obtained by bruising the plant in a mortar, separating the juice and by successive heatings, filtrations and evaporations getting an extract of the required strength. Extracts must be capable of being redissolved, so as to form a solution like that from which they were derived. Extracts are used in cookery, medicine and the manufacture of perfumery.

**Extradition**, *ex tra dish'un*, the delivery of a fugitive from justice by one state to another.



## Eyck

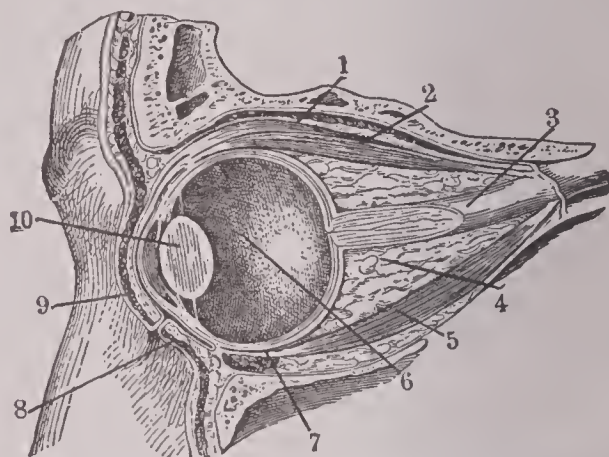
Between nations the matter is usually decided by treaties, specifying the crimes for which extradition is allowed; and usually extradition is neither asked nor granted when no treaty exists. Nations now generally refuse to surrender their own citizens for prosecution by foreign states, and they also decline to extradite political offenders. It has now become the general rule that the criminal who has been extradited cannot be tried except for the offense for which he was extradited. Criminals are extradited from one state to another in the Union, on the demand of the governor of the state from which he has fled.

**Eyck, ike**, HUBERT VAN (1366-1426) and JAN VAN (1390-1441), brothers, famous painters of the old Flemish school, born at Maaseyck. They lived first at Bruges, whence the younger brother is called John of Bruges, and afterward at Ghent, to which place they removed about 1420. Their fame rests on an invention exceedingly important to modern art, namely, a method of painting in oil, which revived an art that had long been lost. The varnish they used prevented the paint from cracking and enabled them to perfect the full, rich color for which their works are famous. Besides this, they introduced naturalism into art and were the first to paint objects just as they saw them. Jan van Eyck also introduced improvements in linear and aerial perspective and in painting upon glass. The *Adoration of the Lamb*, for the cathedral of Ghent, a painting which, in its different parts, contains above three hundred figures, is a masterpiece. It was in two horizontal divisions, comprising ten panels, of which only the two central ones remain at Ghent, the others being at Berlin. Jan finished the work in 1432 and returned to Bruges, where he remained till his death.

**Eye**, the organ of sight, in man nearly spherical and about an inch in diameter. It is made up of three *coats* and three *humors*. The outer coat, or *sclerotic*, covers about five-sixths of the eye, the front one-sixth being called the *cornea*. The sclerotic coat is a white, thick, tough membrane, which by its firmness gives form to the eyeball, protects the delicate parts and gives attachment to the muscles that move the eye. The *cornea* is transparent and fits into the sclerotic coat as a crystal does into a watch. It has neither blood vessels nor lymphatics. The *choroid coat* lies under the cornea and ends in front with the ciliary processes, beyond which is the *iris*. The choroid contains a large number of nerves, blood vessels and cells of coloring

## Eye

matter, which give the dark color to the interior of the eye. The iris is in front of the cornea. It is the visible colored part of the eye and has in the center a round hole, called the *pupil*. The amount of light that enters the eye is regulated by muscles in the iris which make the pupil larger or smaller. When the light is bright the muscle contracts and makes the pupil smaller. For this reason, when a person goes from a brilliantly lighted room into a darker one, he cannot see objects till the pupil dilates and allows more light to enter. The third coat, or *retina*, an expansion of the optic nerve, lies under the



SECTION THROUGH THE LEFT EYE, CLOSED

1, lifting muscle; 2, upper straight muscle; 3, optic nerve; 4, fatty cushion; 5, lower straight muscle; 6, vitreous humor; 7, lower cross muscle; 8, lower eyelid; 9, upper eyelid; 10, crystalline lens.

choroid and terminates near its edge. It is made up of several layers of nervous tissue. The point at which the optic nerve enters the eye forms the *blind spot*, because the nerve fibers here are not sensitive to light.

The humors of the eye are the *vitreous* and *aqueous* humors and the *crystalline lens*. The aqueous humor lies behind the cornea and in front of the crystalline lens. It is a thin, watery fluid, which helps to keep the rounded shape of the front of the eye. The vitreous humor, lying in front of the retina and back of the crystalline lens, is a glassy-looking fluid, about as thick as the white of an egg, and is inclosed in the delicate *hyaloid membrane*. It keeps the eyeball in shape and helps to bend the rays of light to a focus. The crystalline lens, in adults about one-third of an inch long and one-fourth of an inch thick, is inclosed in a capsule, or bag, and lies back of the iris. It looks like clear glass. It is held in place by the *suspensory ligament*, made up in part of the hyaloid membrane and in part of fibers from the ciliary processes. The lens is that part of the eye that does most toward bring-

## Eyelids

ing the rays of light to a focus, or point. Six museles, attached to the sclerotic coat and to the inner part of the orbit, move the eye in the different directions. See ASTIGMATISM; COLOR BLINDNESS; EYELIDS; HYPERMETROPIA; LACHRYMAL GLANDS; MYOPIA; VISION.

**Eye'lids**, the two muscular curtains that can close over the eye and shut out the light. The upper lid has the greater range of motion and in the act of winking spreads the tears over the eyeball to keep it moist. The eyelashes at the edge of the lids prevent particles of dust and other substances from entering the eye. Between the hairs are glands that secrete an oily substance which keeps the eyelids pliable and prevents the tears from running over them, except in crying. The eyelids are lined with a delicate, very sensitive mucous membrane, which is reflected over the front of the eyeball. See EYE; LACHRYMAL GLANDS.

**Eyre, air**, EDWARD JOHN (1815-1901), an English explorer and colonial governor. He went to Australia in 1833, six years later discovered Lake Torrens and in 1840 explored its eastern shores and the adjacent Flinders Range. He then began his perilous journey along the shores of the Great Australian Bight and reached King George's Sound, over a year after setting out. Made governor of Jamaica, he suppressed a negro insurrection with much severity and was recalled.

## Ezra

**Eze'kiel** (God will strengthen), one of the four greater prophets mentioned in the Old Testament, author of the book that bears his name. He was the son of a priest and was carried away captive by Nebuchadnezzar, when the latter captured Jerusalem, probably about 597 B. C. Ezekiel dwelt by the river Chebar, a branch of the Euphrates, and commenced to prophesy about 592 B. C., continuing for about twenty years. The book of *Ezekiel* is divided naturally into two parts; the first, including chapters I-XXXIX, contains the prophecies delivered before and after the destruction of Jerusalem; the second, chapters XL-XLVIII, contains a vision of Israel restored.

**Ez'ra**, a celebrated Jewish scribe and priest. Under his guidance the second expedition of the Jews set out from Babylon to Palestine, in the reign of Artaxerxes I, about 458 B. C. The important services rendered by Ezra to his countrymen on that occasion, and also in arranging, and in some measure, it is believed, settling the canon of Scripture, are specially acknowledged by the Jews, and he has even been regarded as the second founder of the nation. Josephus states that he died in Jerusalem; others assert that he returned to Babylon and died there at the age of 120 years. The book of *Ezra* was originally a part of the book of *Nehemiah*.





**F**, the sixth letter of the English alphabet, the sound of which is formed by pressing the upper teeth on the lower lip and allowing the breath to escape between them. The sound is distinguished from that of *v* by being pronounced with the breath instead of the voice. In form the letter *F* is the same as the ancient Greek digamma, which it also closely resembles in power.

In music, *F* is the fourth note in the major scale of *C*.

**Fa'bius**, an ancient and renowned family of Rome, who, having undertaken the duty of defending Roman territory against the incursions of the Veientes, established themselves at a post on the river Cremera. They were drawn into an ambush and killed (477 B. C.), with the exception of a boy, who happened to be left in Rome and who became the second founder of the family. Among the celebrated members of the family in later times were Fabius Maximus, whose policy of defensive warfare was so successful against Hannibal in the second Punic War, and Fabius Pictor, who lived about the same time and was the earliest Roman historian.

**Fa'ble**, in literature, a term applied originally to every imaginative tale, but confined in modern use to short stories, either in prose or verse, in which animals and sometimes inanimate things are made to act and speak with human interests and passions, for the purpose of pointing a moral. The fable consists properly of two parts—the symbolical representation, and the application, or moral, which must be apparent in the fable itself. The oldest fables are supposed to be the Oriental, and among these the Indian fables of Pilpai, or Bidpai, and the fables of the Arabian Lokman, are celebrated. Among the Greeks, Aesop was the master of a simple but very effective style of fable. The fables of Phaedrus are a second-rate Latin version of those of Aesop. In modern times Gellert and Lessing among the Germans, Gay among the

English and Kryloff among the Russians are celebrated; but the first place among modern fabulists belongs to the French writer La Fontaine.

**Facade**, *fa sad'* or *fa sade'*, the face or front of a building viewed from without. It usually contains the principal entrance. When applied to the faces other than the front of a building, it is used with a qualifying term, as *rear facade*, *lateral facade*, *court facade*.

**Face**, *fase*, **THE**, the front part of the head, including the forehead, eyes, nose, mouth, cheeks and chin. Exclusive of the thirty-two teeth, it is composed of fourteen bones, all but two of which, the lower jaw, or *inframaxilla*, and the *vomer*, which separates the nostrils, occur in pairs. The two bones of the upper jaw carry the upper teeth and form most of the hard palate separating the mouth from the nose. The two *palate* bones complete the hard palate. The two *malars* are the cheek bones. The two *nasal* bones form the bridge of the nose. The two *lachrymals*, or *tear bones*, lie between the eye socket and the nose. The two *turbinated* bones form the outer wall of the nostrils. Of all these bones the lower jaw only is movable, being articulated with the base of the skull. In brutes the jaws project much more than in men and form the prominent feature of the face, while the forehead recedes. See **SKELETON**.

**Faces**, **FALSE**, pasteboard or cloth masks, representing human faces, usually with distorted features. They are made as follows: The sculptor or modeler, with his moist modeling clay, forms in high relief half a face, with conventional features. This is done in order that he may arrive at the proper proportions and distances; but as soon as the regular features are made he begins to distort them. A wad of clay is put on to the end of the nose, and a twist, punch or pull transforms it into whatever shape he desires. The chin, mouth, cheeks, lips and forehead are changed to suit. The modeler is careful to form his model so that

## Facial Neuralgia

there will be no undercuts, or surfaces that curve under, for a hollow plaster of Paris cast is made of the model, and this cast is the mold in which the pasteboard false face is made. If the model has undercuts, the pasteboard cannot be drawn from the mold. The mold, or hollow cast, is made by pouring plaster of Paris, mixed with water, over the face of the model. The workman who does this first dashes the thin plaster into the cracks and crevices of the face and then fills the mold up until it is one to two inches thick. When the plaster is set, it is taken from the clay model and is ready for the workmen who make the pasteboard faces. The pasteboard is soaked in water until it is soft and mushy. In this condition it will conform to every curve and mark in the plaster mold. The first layer is pressed into the mold with the fingers, great care being taken to cover completely every bit of the surface. When this layer of pasteboard is pressed into shape, another is laid on, and thus the face is built of successive layers. Flour paste is used to hold the layers of paper together. After the faces are dried, they are daubed with paint, and the hair, mustache and whiskers are glued in their proper positions. See MASKS.

**Facial Neuralgia**, *fa'sh'l nu ral'je ah* See TIC DOULOUREUX.

**Fac'tor**. See AGENT.

**Factor**, in arithmetic, the multiplier and multiplicand, from the multiplication of which proceeds the product; thus, 7 and 4 are factors of 28. Any one of the several quantities which multiplied together will produce a given number is a factor of that number. In algebra, any expression which is considered as part of a product is a factor.

**Fac'tory and Factory Legisla'tion**. - A factory in its modern sense is an establishment in which several persons coöperate to produce a commodity, the process of manufacture being divided into several stages, each of which is the special work of a separate class of laborers. The development of the factory system has its foundation in the principle, which is now well established, that economy of time, effort and financial expense and an advantage in the quality of production arise when several coöperate in the production of a complex article. The factory system first began to be important about the middle of the eighteenth century in England, when the inventions of Arkwright, Cartwright, Hargreaves and others led to the substitution of large and heavy machinery

## Factory and Factory Legislation

for hand labor with the small, simple tools which had been used previously. The system received a great impetus from the invention of steam power, which again increased the speed with which an article could be produced, caused a saving of labor and money and admitted of the establishment of manufacturing plants wherever conditions were most favorable. The next important step was the improvement in transportation facilities, and the last was the development of the patent system, by which the labors of inventors were protected and preserved to themselves, and the institution of labor-saving machinery was no longer opposed or its inventors persecuted.

The factory system was introduced into the United States about 1790 by Samuel Slater, but its development was slow until 1840. After that time, as population increased, the tendency to concentration of population increased, and the natural consequence was a development of coöperative effort in manufactures. This was vastly hastened by the development of electrical appliances. The benefits of the factory system have been enormous. The division of labor has resulted in a vast improvement in the quality of the article, in a great saving of time and, therefore, the lessening of price; this has led to an increased demand, which, in turn, has improved the demand for labor, raised wages, the standard of living and the general condition of working people. Its evils have been also numerous, but are less important than is usually believed. Women and children have doubtless been employed in greater numbers under the factory system than before; but their employment did by no means begin with the institution of the factory system. Insanitary conditions prevail in many factories; but they are not to be compared in their evil results with the conditions prevailing in sweatshops and tenement houses, where manufactures are carried on. The great subdivision of labor perhaps requires a somewhat lower grade of intelligence, since each worker is required to understand but a small part of the whole process of manufacture. However, the development of machinery has made necessary a deftness of movement and an alertness of mind which were never before required, and the gathering of many workmen together, with the consequent discussion of their needs and conditions, has stimulated the minds and raised the ideals of the workmen as a class. Perhaps the most important result of the factory system has been the widening of the gulf between



capital and labor, since under the old household system of manufacture the capitalist was also the laborer, while under the new order, the two factors of production are not only centered in different persons, but their interests are necessarily growing farther and farther apart. It also causes the distinction between skilled and unskilled labor to be emphasized, to the benefit of the skilled workman and to the disadvantage of the unskilled workman. This probably causes the raising of the average of skill, since it leads many unskilled workmen to make effort to enter the classes above them.

Side by side with the development of the factory system has been the development of labor legislation, most of which in both England and America has been directed to the improvement of the sanitary conditions of work and the protection of the health of the workers in factories. This legislation has taken chiefly three directions: (1) the limitation of child and female labor, (2) the restriction of the hours of labor and (3) the improvement of the conditions of factory work. Most states now prohibit child labor, the age limit being placed variously at from ten to fourteen years. Many states limit, and some prohibit, work by adult women in factories or mines, and a vast majority now limit the hours of work, the average maximum probably being from fifty-five to sixty hours per week. Trades unions have played an important part in securing these reforms and are now devoting their energies to the universal passage of laws limiting the hours of labor to eight in one day. Their efforts have also aided in the accomplishment of another important reform, namely, the increase of the liability of employers for accidents to their workmen. All of these laws have required for their successful enforcement the institution of inspection systems. Inspection is now carried on in almost all states, with a view to bringing to court violators of factory laws. See SWEATSHOP SYSTEM; DIVISION OF LABOR; LABOR ORGANIZATIONS; MASTER AND SERVANT.

**Fag'ging**, a term used in English public schools to denote the services which boys in the lower classes are considered to owe to those in the upper classes. These consist largely in attendance at games and in the performance of personal service for certain upper class boys, to whom they have been especially assigned. A good idea of the custom may be found in Hughes's *Tom Brown's School Days*.

**Fahrenheit**, *fah'ren hite*, GABRIEL DANIEL (1686-1736), a German physicist, born at Dantzic and known for his arrangement of the thermometer. Abandoning the commercial profession which he first followed, he settled in Holland to study natural philosophy. In 1720 he effected a great improvement in thermometers, by the use of quicksilver instead of spirits of wine. He invented the Fahrenheit scale and made several valuable discoveries in physics. See THERMOMETER.

**Faience**, *fa ahNs'*, imitation porcelain, a kind of fine pottery, superior to the common pottery in its glazing, beauty of form and richness of painting. It derived its name from the town of Faenza, in Italy, where a fine sort of pottery, called *majolica*, was manufactured as early as the fourteenth century. The modern faience appears to have been invented about the middle of the sixteenth century, at Faenza, as an imitation of majolica. True faience is made of a yellowish earth, covered with an enamel which is usually white, but may be colored. See MAJOLICA; POTTERY.

**Faint'ing** or **Syncope**, *sin'ko pe*, a sudden suspension of the heart's action, of sensation and of the power of motion. It may be produced by loss of blood, pain, emotional disturbance or by organic or other diseases of the heart. A person fainting should be laid upon the back, with his head and shoulders slightly lower than his body, and his clothing should be loosened wherever it impedes circulation. Cold water may be sprinkled on the face and stimulating odors applied to the nostrils. Protracted cases need the advice and treatment of a physician.

**Fair'bairn**, WILLIAM, Sir (1789-1874), a British civil engineer, born at Kelso, Roxburghshire. He was apprenticed to a machinist at a colliery in North Shields and commenced business on his own account in 1817 with a Mr. Lillie, in Manchester, where he made many improvements in machinery, such as the use of iron instead of wood in the shafting of cotton mills. About 1831, his attention having been attracted to the use of iron as a material for shipbuilding, he built the first iron ship. His firm became extensively employed in iron shipbuilding at Manchester and at Millwall, London, and had a great share in the development of the trade. Fairbairn shares with Stephenson the distinction of building the great tubular bridge across the Menai Strait, and he built more than a hundred bridges upon this principle. He was president of the British Association for the

## Fairbanks

Advancement of Science in 1861 and later was made a baronet.

**Fair'banks**, CHARLES WARREN (1852-- ), an American statesman, born on a farm in Ohio, educated at Ohio Wesleyan University and admitted to the bar in 1874. He practiced law for a number of years in Indianapolis and in 1897 was elected United States senator from Indiana and was reëlected in 1903. In 1898 he was a member of the British-American joint high commission and chairman of the American commissioners. In 1904 he was elected vice-president of the United States on the Republican ticket, and served one term.

**Fairbanks**, THADDEUS (1796-1886), an American inventor, born at Brimfield, Mass. When a young man he removed to Saint Johnsbury, Vt., and entered into partnership with his brother, in the manufacture of stoves, plows and other iron implements. His first skill as an inventor was made known through the invention of a stove, which was much more convenient and useful than any pattern that had preceded it. He also patented a cast iron plow that was considerably in advance of other implements of the sort; but his fame rests on the invention of the platform scale, which so completely met universal demand for weighing heavy commodities that the company gave their entire attention to the manufacture of this and other scales of numerous patterns, most of which were invented by Mr. Fairbanks. At the time of his death he was at the head of the largest scale manufactory in the world. His scales found use in every civilized country, and in recognition of the benefit which he had conferred upon commerce, numerous ranks and titles were bestowed upon him and he was the recipient of medals from many foreign lands. He was the founder of Saint Johnsbury Academy, which he liberally endowed.

**Fair'child**, JAMES HARRIS (1817-1902), an American educator and clergyman, born at Stockbridge, Mass., and educated at Oberlin College, being a member of the first class that entered the institution. Later he became professor of Latin and Greek at Oberlin, and in 1867 he was chosen president of the college, which position he held for 22 years. He exhibited great ability as an organizer and educator, and during his presidency of the college its influence was greatly strengthened and its work broadened.

**Fairchild**, LUCIUS (1831-1896), an American soldier, born at Franklin Mills, Ohio. At the age of fifteen he moved to Madison, Wis., and from 1849 to 1855 lived in California. Return-

## Fairies

ing to Wisconsin, he studied law and was admitted to the bar in 1860. In 1861 he was made captain in a Wisconsin regiment and became colonel and later captain in the regular army. At Bull Run he commanded the famous "iron brigade," and at Gettysburg led a charge at Seminary Ridge, where he was severely wounded. In the same year he was commissioned brigadier general of volunteers, but resigned. Afterward he was governor of Wisconsin for three terms, later entered the consular service, serving at Liverpool and Paris, and was minister to Spain from 1880 to 1882. He was in 1886 commander in chief of the Grand Army of the Republic.

**Fair'fax**, THOMAS (1612-1671), a British commander during the war between Charles I and Parliament. In this struggle he served as cavalry officer in the Parliamentary army and first distinguished himself at Marston Moor. Later he was for a time commanding general of all the Parliamentary forces, and the victory at Naseby was due in large measure to him. Because Fairfax would not march against the Scotch when they proclaimed Charles II king, Cromwell was made commander in chief in his stead and Fairfax withdrew from the army. During Richard Cromwell's short rule Fairfax was a member of Parliament, and he was one of the delegates who conferred with Charles II. He wrote a history of the civil war.

**Fair'field**, IOWA, a city and the county-seat of Jefferson co., on the Chicago, Rock Island & Pacific and the Chicago, Burlington and Quincy railroads, 50 mi. w. n. w. of Burlington. Parsons College is located here. The city has manufactures of wagons, furniture and agricultural implements. Population in 1910, about 5000.

**Fairha'ven**, WASH., a former city in Whatcom co. It was united with the city of Whatcom in 1903 to form Bellingham. See BELLINGHAM.

**Fair'ies**, the small folk familiarly spoken of everywhere, though known among different people by various names. They are usually represented as of small and graceful human shape, although they may appear in any form they choose. Among almost all peoples there is a classification of fairies into good and evil spirits, the good spirits inhabiting the air and the evil ones dwelling underground. In northern Europe the fairies are divided into two races: the *elves*, graceful, sportive fairies who dance about the woods and often take a beneficent interest in the affairs of human beings; and the *dwarfs*, or *gnomes*, who dwell underground and



## Fairies

are the guardians of the jewels and metals hidden in the earth. They are for the most part somewhat malicious spirits, although their cleverness and their ability to forge wonderful weapons make them of great use to mankind if they can be induced to be favorable. A part of the dwarfs, known as *trolls*, live in the hills and often emerge to steal from men not only personal property, but women and children. These little beings are regarded, not as immortal, but as living for a very long period.

Besides these spirits which inhabit the earth, there is supposed to be, by most northern nations, a class of *nixies*, water spirits, who, though not distinctly malicious, are very fond of enticing men or carrying them off by force to their caves in the sea. Among these nixies the most famous was the Lorelei, who from her cliff on the Rhine lured sailors to death by her beauty and the sweetness of her song. *Undines*, a sort of water spirits, are supposed to enter sometimes into various relations with human beings. If an undine marries a mortal and bears a child, she receives a soul. In Ireland, *pixies* are certain small beings into whom enter the souls of children who die unbaptized. In Ireland, too, as in Scotland, there is a belief in *banshees*, little old women who take up their abode in all houses of any importance and announce the death of a member of a family by wailing or by appearing in mortal form. Perhaps the most perfect ideal of the fairy type is the Persian *peri*, who lives upon perfume and tries by loving deeds to win an entrance to paradise, from which she is shut out by her lack of a soul.

Of course each nation adapts its fairies somewhat to its own customs. Thus, the Russian fairy is regarded as clad always in furs; the Chinese fairy wears a queue, and the Hindoo fairy has the wisdom of the Brahmins. English fairies are thought of chiefly in connection with the flowery fields and woods, about which they are supposed to dance on summer nights. Shakespeare's *Midsummer Night's Dream* gives a vivid idea of some of the more common fairy myths in England.

The origin of these creatures of the imagination is probably similar to that of all myths. Every phase of nature which demands accounting for is explained as the manifestation of some supernatural being. As education increases, the belief in fairies of course diminishes, but among the uneducated peasant classes the belief is still strong in most countries. There is a large literature of fairy tales, among the best of which are

## Fairs

Hans Christian Andersen's and Grimm's *Fairy Tales*. These, of course, deal not only with fairies but with all sorts of supernatural beings and treat often of everyday objects as if they were possessed of intelligence and the power of speech.

**Fair'mont**, W. VA., the county-seat of Marion co., 77 mi. s. e. of Wheeling, on the Monongahela River and on the Baltimore & Ohio and other railroads. A state normal school is located here, and the city has a fine courthouse. There are extensive coal mines, and the other important industrial establishments include flour mills, foundries, planing mills, machine shops, glass works and cigar factories. Population in 1910, 9711.

**Fair Oaks**, BATTLE OF, an important battle of the Civil War, fought during the Peninsula Campaign (See PENINSULA CAMPAIGN), about seven miles east of Richmond, Va., on May 31 and June 1, 1862, between a force of about 42,000 Federals, from the Army of the Potomac under General McClellan, and about an equal force of Confederates, under generals Joseph E. Johnston and G. W. Smith. After Johnston's retreat from Williamsburg toward Richmond, McClellan followed him leisurely, and upon reaching the Chickahominy River sent two corps of his army under Keyes and Heintzelman to the south side of the stream. Johnston immediately decided to attack this force before it could be reënforced or could recross the river. The attack was begun May 31 about 1 p. m. by General Longstreet, who drove Keyes's troops from their position back toward the Chickahominy. McClellan ordered a force under General Sedgwick and Sumner to cross the river in order to relieve General Keyes. This force engaged part of General Smith's Confederate command near Fair Oaks Station and was compelled to fight desperately for several hours to maintain its position. It was at this point that General Johnston was severely wounded; his command fell first upon General Smith and later upon General Lee, who thereafter was head of the Army of Northern Virginia. About the middle of the following day, the battle having raged since morning, General Lee withdrew toward Richmond. The loss of the Confederates was about 5200; of the Federals, slightly less.

**Fairs**, periodical meetings of persons having goods or wares for sale, held in an open market at a central location, generally for the transaction of a particular class of business. In the

## Fairweather

Middle Ages fairs were of great importance and were specially privileged and chartered by princes and magistrates, public proclamation being made of their commencement and duration. But modern facilities for communication have much diminished the necessity for periodical markets, and it is now chiefly among agriculturists that they are of much importance. In Europe the most important fairs of the present day are those at Leipzig and Frankfort-on-the-Main in Germany, at Lyons in France and at Nijni-Novgorod in Russia. The latter is, indeed, the largest fair in the world. Fairs in the sense of markets are almost unknown in the United States, but the term is usually given to bazaars or collections of the products of art or industry for public exhibition and competition. They are usually combined with amusement features.

**Fair'weather**, MOUNT, on the west coast of North America, in Alaska. Its height is uncertain, but is supposed to be approximately 14,900 feet. Its summit is crowned with perpetual snow.



CARDINAL FALCONIO

**Fakirs**, *fa'kurz* or *fa keerz'*, (poor men), fanatics, met with chiefly in India and the neighboring countries, who retire from the world and give themselves up to contemplation. They are properly of the Mohammedan religion, but the term is often used for a mendicant of any faith. They are found living both in communities and in solitude. The wandering fakirs gain the

## Falkland Islands

reverence of the lower classes by absurd penances and self-mutilations.

**Falcon**, *fa'k'n*, strictly, the name of a hawk famous for its strength, symmetry and remarkable



GREENLAND FALCON

power of flight. Its claws are sharp and hooked, its short, stout legs are heavily feathered and its curved beak is armed with a sharp point. The peregrine falcon was the one most used in hunting game (See FALCONRY), but there are several other species that are almost equally powerful and graceful.

The Greenland falcon is one of the best-known.

**Falconio**, DIOMEDE (1842– ), an American Roman Catholic cardinal. Although born in Italy, he came to the United States at the age of twenty and nearly his entire life has been spent here. This fact entitles him to recognition by his Church as an American. He was ordained priest in Buffalo in 1866, went in 1871 to Newfoundland, where he remained ten years. After that time he spent a few years in Italy in prominent positions in the Church, but in 1899 he was appointed by the pope first apostolic candidate to Canada, from which place he was transferred to Washington in a similar capacity in 1902. On November 27, 1911, Monsignor Falconio and Archbishops Farley and O'Connell were named by the pope as American cardinals.

**Falconry** or **Hawk'ing**, the pursuit of game by means of trained falcons or hawks. Falconry is a very old amusement in Europe and Asia. In the Middle Ages it was the favorite sport of princes and nobles; and, as ladies could engage in it, it became very prevalent. In Germany Henry the Fowler and the Emperor Frederick the Second were much addicted to this sport, the latter having written a work on falconry. In France it reached its height under Francis I, whose grand falconer had under him an establishment of fifteen nobles and fifteen falconers, costing annually about 40,000 livres. In Britain it was practiced among the Anglo-Saxons, but grew still more in favor after the Norman Conquest.

**Falkland**, *fa'k'land*, **Islands**, an island group belonging to Great Britain, in the South



Atlantic Ocean, about 300 mi. e. of the Straits of Magellan. The group consists of two large islands, East Falkland and West Falkland, covering respectively about 3000 and 2300 sq. mi., and a great number of smaller ones surrounding them. The total area is about 7500 square miles. They are hilly and boggy, entirely destitute of trees, but covered with a variety of grasses very nutritive for sheep and cattle, the rearing of which is the principal industry. Fish and sea fowl abound. Wool, frozen meat, hides and tallow are the chief exports. The Falkland Islands were discovered by Davis in 1592. Settlements were afterward formed on them by the French, Spaniards and English, alternately, but the latter retained possession of them. The colony has a governor and other officers appointed by the crown. Port Stanley, in East Falkland, is a thriving settlement. Population of the islands in 1911, 2272.

**Fallacy**, *fal'las sy*, in logic, a fault in the form of reasoning, which leads to a wrong conclusion. The term is also applied to faults in the substance of an argument, such as proving one proposition by assuming another which is identical with it. Fallacies are of two kinds, deductive and inductive. Some of the most common deductive fallacies are the following:

(1) The fallacy in which the argument is turned from the merits of the case to the character of the opposition of one's opponent. This form of arguing is often practiced by attorneys.

(2) The fallacy of appealing to the passion or prejudice of an audience, rather than to their reason. This fallacy is the resort of the demagogue.

(3) The fallacy which consists in taking advantage of a person's ignorance and consequent lack of power of discrimination between the true and the false. This is resorted to by attorneys and agents.

(4) The fallacy of appealing to the sentiment of veneration for authority, instead of appealing directly to reason. Some persons place great weight upon names of eminent men and use these as a convincing argument, while from the logical point of view they are no argument at all.

Inductive fallacies are due to errors in observation, errors in judgment, errors of the imagination and errors in the reasoning process. For a fuller explanation of these, see CONCEPT; INDUCTIVE METHOD.

**Fallieres**, *fah lyair'*, CLEMENT ARMAND (1841- ), a French statesman, president of

the French Republic. His political career began in 1876, when he was elected to the national Chamber of Deputies. He served in succession as minister of the interior, minister of public instruction and minister of justice. In 1890 he was elected to the Senate, of which he became president when Loubet was elected president of the Republic. His election to the presidency took place in 1906; his term ended in 1913.

**Fall'ing Bod'ies**. Because of the attraction of gravity, all bodies when unsupported fall toward the center of the earth. A ball held in the hand presses downward; if dropped it descends in a perpendicular line; if placed on an inclined plane, it rolls down. In the air, bodies fall with unequal velocities; for instance, a piece of paper falls more slowly than a bullet, but this is because of the peculiar shape of the bodies, that of the paper being such as to receive much resistance from the air, while the bullet receives comparatively none. If a feather and a bullet or a piece of paper and a bullet are placed in a long glass tube, from which the air has been taken, they will fall with an equal velocity.

Falling bodies are subject to the laws of gravity. These are as follows:

(1) Gravity imparts to a falling body an acceleration of 32.16 feet, or 980 centimeters, per second.

(2) The distance a body falls in a second under the influence of gravity is one-half the acquired acceleration, or 16.08 feet, or 490 centimeters; therefore this is the distance which a body falls the first second. In the second second it falls 32.16 feet, or 980 centimeters, from its acquired acceleration, and 16.08 feet, or 490 centimeters, additional to the acceleration of gravity; during the second second, therefore, it falls 48.24 feet, or 1470 centimeters, in all, and during the two seconds it falls four times 16.08 feet; that is, 64.32 feet, or 1960 centimeters. When a body is thrown upward, these laws apply in reverse order.

From the foregoing laws the following rules in regard to falling bodies are obtained:

(1) To find the distance a body falls in a given number of seconds, multiply the distance it falls in the first second by the square of the number of seconds. In three seconds a body will fall nine times 16.08 feet; that is, 144.72 feet, or 4410 centimeters.

(2) To find the distance a body falls in any given second, multiply the distance it falls the first second by twice the number of seconds

## Fallow Deer

less 1. To find the distance a body falls in the fourth second, multiply 16.08 feet, or 490 centimeters, by 7; the distance is 112.56 feet, or 3430 centimeters.

(3) To find the velocity of a falling body at the end of any given second, multiply 32.2 feet, or 980 centimeters, by the number corresponding to the second. To find the velocity of a falling body at the end of the third second, multiply 32.16 feet, or 980 centimeters, by 3. The velocity is 96.48 feet, or 2940 centimeters per second.

**Fal'low Deer**, a common European deer, found also in northern Africa. It is smaller than the stag and is of a brownish color, with white beneath, on the insides of the limbs and beneath the tail. The horns, which are peculiar to the male, are very different from those of the stag; they are not branched, but are broader and more spreading. The flesh of the fallow deer is considered the most savory of venison. See **DEER**.

**Fal'laws**, **SAMUEL** (1835-), an American clergyman and educator, born at Pendleton, England. He came to America in 1848, settling in Wisconsin, graduated from the University of Wisconsin. He entered the Civil War as chaplain of a Wisconsin regiment, was promoted and left the service as a brigadier general in 1865. For three years he was state superintendent of public instruction of Wisconsin and later was president of Illinois Wesleyan University. In 1875 he became rector of St. Paul's Reformed Episcopal Church in Chicago, and in the following year he was made bishop. Bishop Fallows also held numerous positions of trust and honor in associations and movements of national importance. His theory that nervous diseases might be cured through mental suggestion attracted world wide attention and won many adherents.

**Fall River**, **MASS.**, an important manufacturing city of Bristol co., situated on the Taunton

## Famine

River at its mouth, on Mount Hope Bay, 50 mi. s. of Boston and on the New York, New Haven & Hartford Railroad. It is also connected with New York, Philadelphia and Newport by lines of steamers. The city is about eleven miles long and has an area of 41 square miles. It is well laid out and has a number of public parks and pleasant drives. Among the notable buildings are the B. M. C. Durfee High School, the state armory, the postoffice and custom house, the city hall, Bradford Durfee Textile School, Central Congregational Church, Church of the Ascension, Saint Mary's Pro-Cathedral, Notre Dame Church, Saint Anne's Church and the public library, which has a collection of over 80,000 volumes. The leading educational institutions of the city are the Bradford Durfee Textile School, Thibodeau's Commercial College, the Rogers and Allen's School and Notre Dame College. The charitable institutions include a Home for Aged People, Children's Home, Saint Vincent's Home and Saint Joseph's Home.

Fall River is one of the leading industrial cities in the United States. Fall River furnishes an abundance of water power. The most important industries are those connected with the manufacture of cotton goods. The mills have over 3,400,000 spindles and 86,000 looms. There are also important manufactures of woolen goods, men's hats, knit goods, boots and shoes, spools and bobbins and foundry and machine shop products. The city has extensive bleaching works, carriage factories, rope and twine works and breweries, and there is an important quarry near. Fall River was formerly a part of Freetown, but was incorporated under its present name in 1803 and was chartered as a city in 1854. Population in 1910, 119,295.

**False Pretens'es**, in law, false representations and statements, made with a design to obtain "money, goods, wares and merchandise," with intent to cheat. At common law it is a misdemeanor.

**Famil'iar Spir'its**, demons, or evil spirits, supposed to be continually within call and at the service of their masters. Sometimes they assume shape, sometimes are attached to a magical ring or the like, sometimes are compelled by magic skill and sometimes do voluntary service. We find traces of this belief in all ages and countries, under various forms.

**Fam'ine**, a dire want of food, affecting considerable numbers of people at the same time. Irregular rainfalls in tropical climates, imperfect methods of irrigation or the too exclusive depend-

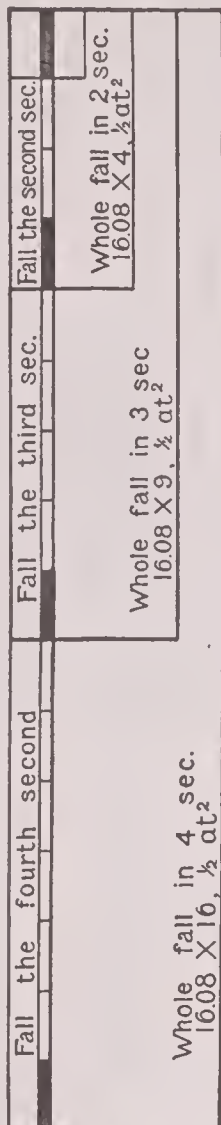


DIAGRAM ILLUSTRATING LAWS OF FALLING BODIES



## Fancy

ence of the mass of people on a single article of food, which happens to fail, are among the commonest causes of famines. In the early and medieval ages they were frequent; but the rapidity of modern communication and transport has made the rigor of famine almost impossible in Europe. India has long been the seat of terrific famines; but of late the British officials have been very active in organizing relief measures. Among the more recent famines are the one in Northwest India (1837-1838), in which about 800,000 perished; that in Bengal and Orissa (1865-1866), when about 1,000,000 perished; and that in Bombay, Madras and Mysore (1877), in which about 500,000 died. In China a great famine took place in 1877-1878, in which over 9,000,000 are said to have perished, and another occurred in 1888-1889, owing to the overflow of the Yellow River. In Russia, in 1891, a vast number of people suffered and many died. In India, again, in 1900, fully 1,000,000 people starved, and in China, in 1902, probably more than this number died as the result of a famine.

**Fancy**, *fan'sy*, a term approaching imagination in meaning. In its general acceptation it refers both to the forms of the imagination and to the mental faculty which produces them; but it is used frequently for the lighter or more fantastic forms of the imagination.

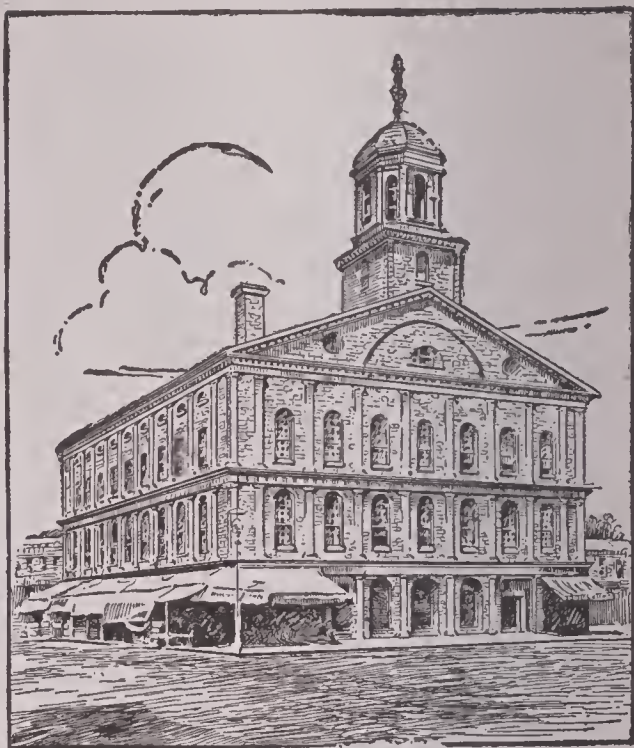
**Fandan'go**, an old Spanish dance, which probably originated with the Moors in Andalusia. It is seldom danced except at the theater and in the parties of the lower classes. It is danced by two persons only, who never touch so much as each other's hands, though the motions of the dancers are often improperly suggestive.

**Faneuil**, *fan'el*, **Hall**, a public building in Boston, built by Peter Faneuil in 1742, as a gift to the town, comprising, originally, a market house and a townhall, with other rooms. It was burned in 1761, rebuilt in 1763 and enlarged in 1805. The hall is famous as the place where stirring speeches were made and political meetings held at the outbreak of the Revolutionary War, whence it derived the name of "Cradle of American Liberty." It was here, in 1773, that an immense public meeting was held, at which the "Boston Tea Party" was organized. Wendell Phillips made his first anti-slavery speech in this building, in 1837, at a memorial meeting in honor of Elijah Lovejoy, killed by a mob at Alton, Ill.

**Fan Palm**, *palm*, a name quite generally

## Farco

applied to those species of palms which have broad, fan-like leaves. See **PALMS**.



FANEUIL HALL

**Far'aday**, **MICHAEL** (1791-1867), one of the greatest of English chemists and physicists, born in humble circumstances at Newington Butts, near London. Sir Humphry Davy appointed him his assistant at the Royal Institution, and in 1829 he became lecturer at the Royal Military Academy at Woolwich. It was while in the chair of chemistry at the Royal Institution that he made most of his great electrical discoveries, which confirmed him in his position as one of the most successful experimenters ever known in physics. In 1832 he received the honorary degree of D.C.L. from Oxford and was made an honorary member of the Academy at Berlin. In 1835 he received a pension of \$1500 a year from Lord Melbourne. Among his published works were the following: *Researches in Electricity*, *Lectures on Non-metallic Elements*, *Lectures on the Forces of Matter* and *Lectures on the Chemical History of a Candle*.

**Farallones**, *fah ra lohnz'*, a group of small islands in the Pacific, about 30 mi. from the entrance to the Bay of San Francisco.

**Farce**, *fahrs*, a form of the drama which differs from comedy by being more extravagant and ludicrous. Any form of absurdity or improbability is allowable, provided only that it provokes laughter. Originally the farce was considered merely as comedy in a somewhat exaggerated degree, but in the eighteenth cen-

tury it came to be regarded as a distinct form of drama.

**Far Eastern Question**, the name used to indicate the problem of international politics growing out of the development of the interests of western powers in Asia, especially in those countries bordering upon the Pacific. The problem has assumed especial importance within the last quarter of the nineteenth century, when the Chinese Empire seemed on the point of a rapid decline and thus appeared to be an easy prey to the commercial nations of Europe. China's weakness was further revealed by its war with Japan in 1894 and 1895, which resulted in a complete victory for the island empire. It was then, also, that Russia and Germany intervened, to prevent Japan from reaping the full fruits of its victory, and at the same time to secure for themselves commercial posts and coaling stations, from which to extend their spheres of influence in the East. The unexpected entrance of the United States into the affairs of Asia was the result of the Spanish-American War, which threw into its hands the control of the Philippines. The influence of America, however, was clearly shown at the close of the Boxer Rebellion in 1900, when by astute diplomacy on the part of the United States government, the interested nations promised to maintain the so-called "open door" policy in China. At the present time Japan is in possession of Korea and southern Manchuria; Russia maintains a more or less firm control of northern Manchuria; Germany has important concessions in the Shan-tung Peninsula and in the rich Hoang-ho region; Great Britain has Hong Kong and Wei-hai-wei in the neighborhood of the Yang-tse-Kiang; France is in the southern part of China and is practically allied with Russia as regards eastern diplomacy; the United States, in the Philippines, supported by Great Britain and Japan, is attempting to maintain the open door, with the forced consent and approval of the other nations. It seems to be only a matter of time before the Far Eastern Question, now the most important problem of international diplomacy, will cause a world contest and a readjustment of the rank of nations.

**Fargo**, *fahr'go*, N. D., the county-seat of Cass co., is situated on the Red River of the North, 250 mi. n. w. of Minneapolis, Minn., and on the Northern Pacific, the Great Northern and a branch of the Chicago, Milwaukee & Saint Paul railroads. It is directly across the river from

Moorhead, Minn., with which it is connected by an electric railway. The city is an important grain market and also has a large trade in agricultural implements. Fargo is the seat of the state agricultural college and of the Fargo College (Congregational), and is the see city of the Catholic diocese of Fargo and of the Episcopal diocese of North Dakota. Population in 1910, 14,331.

**Fargus**, *fahr'gus*, FREDERICK JOHN (1847-1885), an English novelist, best known by his pseudonym, Hugh Conway. The work for which he is remembered is *Called Back*, a sensational novel published in 1884, of which half a million copies were sold.

**Faribault**, *fair'i bo*, MINN., the county seat of Rice co., 52 mi. s. of Saint Paul, at the junction of the Straight and Cannon rivers and on the Chicago & Great Western, the Rock Island, the Chicago, Milwaukee & Saint Paul and other railroads. The city is beautifully located in a region having many lakes. Here are the Shattuck School for Boys, Saint Mary's School for Girls, Bethlehem Academy for Girls and the Seaburg Divinity School; also the state schools for the blind, the deaf and dumb and the feeble-minded. Faribault was settled about 1850. Population in 1910, 9001.

**Farinelli**, *fah're nel'ly*, CARLO (1705-1782), an Italian singer whose real name was Broschi. In early childhood he attracted the attention of musicians in Italy and soon aroused the greatest enthusiasm by his remarkable soprano voice. Traveling through Austria and Germany he received a continuous ovation, and in Spain he long held a position of peculiar influence at court. He was banished by Charles III in 1759 and died in his own beautiful palace at Bologna. He possessed probably the most remarkable male soprano voice ever known, both as to range and quality.

**Farini**, *fa re'ne*, LUIGI CARLO (1812-1866), a celebrated Italian statesman and historian, born at Russi, near Ravenna, Italy. He graduated at the University of Bologna and began the practice of medicine, but his part in the early revolutionary movements of 1840-1850 compelled him to leave Italy. Under the liberal administration of the latter part of this period he held positions of responsibility and later retired to Piedmont, where he devoted himself to writing in the interests of the liberal movement headed by Cavour. During this time he also wrote a history, *The Roman State from 1814 to 1850*, which is the work on which his fame chiefly rests.



## Farjeon

In 1860 he labored earnestly in Parma, Bologna and Florence in favor of the unification schemes of Victor Emmanuel, and in the same year he became minister of the interior. Soon afterward his health failed and he died. He probably exerted an influence second only to that of Garibaldi and Cavour in favor of a united Italy.

**Farjeon**, *fahr'jon*, BENJAMIN LEOPOLD (about 1836-1903), an English author. He was born in London, but went while quite young to the gold diggings in Australia and later removed to New Zealand. His first book was *Shadows on the Snow*, but the first one which met with success was *Grief*, published after his return to London. Among his other books are *Joshua Marvel*, *The House of the White Shadows* and *The Mesmerists*. Farjeon made a tour of the United States in 1877, giving readings from *Blade-o'-Grass*.

**Farley**, *fahr'ly*, JOHN MURPHY (1842- ), an American Roman Catholic cardinal, born



JOHN MURPHY FARLEY

in Newton Hamilton, Maragh County, Ireland. He was educated in Ireland and at Saint Joseph's Seminary in Troy, N. Y. He also studied four years in the American College at Rome, where he was ordained priest in 1870. He immediately returned to America, but in 1884 became private chamberlain to Pope Leo XIII. Seven years later he was made vicar-general of the archdiocese of New York. In 1895 he was auxiliary

## Farnese Palace

bishop of New York, in 1902 became archbishop, and in 1911 cardinal. He is the author of several controversial and historical works.

**Farmers' Alliance.** See POPULIST PARTY.

**Farmers' Institute**, a meeting for instruction and mutual benefit of farmers. As ordinarily conducted, a farmers' institute consists of a three or four days' meeting, which is planned to reach the farmers of several adjoining towns. The meeting is usually conducted by one or more men who are experts in certain lines of agricultural work. The conductors arrange the program, give talks on their specialties and invite general discussion from the farmers present. The evenings are usually devoted to popular lectures, and the exercises are interspersed with music. In most states farmers' institutes are managed by the state board of agriculture, who employ a superintendent, whose business it is to organize the institutes, conduct or visit them as far as possible and see that the programs are beneficial to the farmers. The farmers' institute plan originated with the state agricultural colleges and is the means of disseminating much valuable information.

**Farm'ing.** See AGRICULTURE.

**Farne**, *fahn*, **Islands** or **Fern**, *furn*, **Islands**, a group of islets belonging to Great Britain, in the German Ocean, off the north coast of Northumberland, 2 mi. e. by s. of Bamborough Castle. They have been the scene of several disastrous shipwrecks. These islands are the scene of the heroic deeds of Grace Darling.

**Farnese**, *fahr na'sa*, an illustrious family of Italy, whose descent may be traced from about the middle of the thirteenth century and which gave to the Church and the Republic of Florence many eminent names. The name of the Farnese is associated with several famous works of art found at Naples. See FARNESE PALACE.

**Farnese Palace**, a celebrated building in the city of Rome, erected by Pope Paul III and completed by Michelangelo. It is one of the finest palaces in Rome, and the blocks of stone of which it is constructed were taken from the theater of Marcellus and from Colos. Most of the art treasures formerly contained in it are now at the museum of Naples, but a few excellent works remain. The Farnese Bull and the Farnese Hercules were first placed here. The palace now belongs to the ex-king of Naples, the Farnese family having become extinct.



## Faroe Islands

**Faroe**, *fa'ro* or *fa'ro e*, **Islands**, a group of islands in the North Atlantic, lying between Iceland and Shetland. They belong to Denmark and are twenty-five in number, of which seventeen are inhabited. The chief island, Strömö, is 27 miles long and 8 miles wide, and others are Osterö, Vaagö, Borö, Viderö, Sandö and Suderö. The entire area is 514 square miles. The coasts are steep and are indented with deep inlets. The islands are mostly of volcanic rock, and they are frequented by hurricanes. The inhabitants are chiefly engaged in fishing and the rearing of sheep. Thorshavn, in Strömö, is the seat of government. Population in 1911, 18,000.

**Far'ragut**, DAVID GLASGOW (1801-1870), a famous American naval officer. He entered the



DAVID G. FARRAGUT

navy as midshipman at the age of nine, took part in the War of 1812 and in the Mexican War, held various positions of importance and for the four years after 1854 was employed in founding the Mare Island Navy Yard, at San Francisco. In 1861 he was assigned to go with the expedition against New Orleans, undertaken on the formation of the Confederacy, and sailed in February of the following year. New Orleans surrendered to the combined attack of the land and naval forces in April, and Farragut, after

taking possession of Baton Rouge and Natchez and running the batteries at Vicksburg, joined the Union fleet above. In consequence of his success at New Orleans he was promoted to the rank of rear admiral. In 1863 Farragut passed the batteries at Port Hudson and was of the greatest assistance to the land forces in the attacks on Port Hudson and Vicksburg. In August, 1864, he attacked the Confederate fleet in the Bay of Mobile and forced it to surrender, thus making the fall of Mobile merely a question of time. In 1866 he was made admiral, a grade which till then had not existed in the United States navy.

**Far'rar**, FREDERICK WILLIAM (1831-1903), a writer, preacher and teacher, born at Bombay, India, and educated at the University of London and at Trinity College. In 1855 he was assistant master at Harrow and later was the head master of Marlborough College, which he made one of the first schools in England. He also served as chaplain of the House of Commons and was dean of Canterbury in 1895. He wrote many works of fiction, biography, philology and history. Among his principal works are *Life of Christ*, *Life of Saint Paul* and *The Eternal Hope*. These books are for the masses and helped to raise religious thought to a higher plane.

**Farthing**, *fahr'thing*, in English money, a common coin of bronze, equal to a fourth part of a penny and about one-half a cent in United States money. See POUND

**Far'well**, CHARLES BENJAMIN (1823-1903), an American statesman and merchant, born in New York State. He removed to Illinois and was county clerk of Cook County from 1854 to 1862. He engaged in the wholesale dry goods business with his brother, and in 1870 he was elected to Congress. He was reelected for the term 1872-1874, and again from 1880 to 1887. In that year he was elected to the United States Senate, to fill the unexpired term of John A. Logan.

**Fasces**, *fas'seez*, among the ancient Romans, a bundle of polished rods, in the middle of which was an ax, carried by lictors before superior magistrates. The number of fasces and lictors varied with the dignity of the magistrate. In the city the ax was laid aside.

**Fashion**, *fash'un*, the prevalent style in dress; usages which society adopts at its pleasure and imposes on its members. To be dressed *in fashion* is to be dressed in accordance with the accepted character, or style, of each part of the apparel. Fashions change from time to time



and are ostensibly based on what is most serviceable in practice and sometimes on what is most elegant in design. The various fashions of past ages, however, show that caprice has been responsible to a greater degree for the frequent and marked changes than practical consideration. See DRESS.

**Fasho'da**, a town in the Egyptian Sudan, founded in 1867 by the Egyptian government. When the revolt of the Mahdi occurred in 1881, the inhabitants of Fashoda almost deserted it. In 1898 it was occupied by the French, and the British later in the same year demanded that the French leave it. Only by making numerous commercial concessions to the French did the British secure the evacuation of the town.

**Fast'ing**, the partial or total abstinence of mankind and animals from the ordinary requisite supply of food, by which is to be understood that quantity which is adapted to preserve them in a healthy and vigorous condition. Various warm-blooded animals are capable of living without food much longer than human beings. Cats and dogs have survived for several weeks without nourishment of any kind, and hibernating animals have lived several months, but it is probable that few human beings could survive such deprivation for more than a week. Death usually ensues after the fifth or sixth day, especially if there is a loss of four-tenths of the weight of the body. The use of water without solid food enables life to be sustained much longer than it could otherwise be.

**Fasts**, temporary abstentions from food, especially on religious grounds. Abstinence from food, accompanied with signs of humiliation and repentance or grief, is to be found in nearly all religions. The Mohammedans fast during their month Ramadan. A Jew fasts on the anniversary of a parent's death, on his birthdays after he is thirteen years of age, and on the birthdays of his first-born son till he is thirteen, besides the regular fast days. The Greek Church observes forty-eight days at Easter and thirty-nine at Christmas. Other churches have fixed fast days. Among the fast days appointed by presidents of the United States were January 12, 1815; the last Thursday of September, 1861; April 30, 1863; the first Thursday in August, 1864; June 1, 1865; May 9, 1878; September 26, 1881.

**Fat**, an oily substance, found in all parts of the body except the teeth, bones and fibrous tissue, is abundant in milk, in the marrow of bones and around various internal organs. It

gives the human frame its smooth, rounded outline and, being a bad conductor of heat, it is useful in retaining warmth. It aids the movements of certain organs, as the eye, the orbit of which is lined with fat. The quantity of fat varies at different periods of life, being most abundant in the young and in middle life.

**Fa'talism**, the belief in fate, or an unchangeable destiny, to which everything is subject, and by which every act is preëstablished. Among notable historical examples of the belief in fate may be mentioned the old Greek conception of a fate which stood behind the gods themselves as a controlling power, and the Mohammedan fatalism, which regards all things great and small as inexorably predetermined, so that no accident is possible.

**Fata Morgana**, *jah'tah mor gah'nah*, the name of a peculiar mirage, occasionally seen in the Strait of Messina, between the coasts of Sicily and Calabria. The images of men, houses, towers, palaces, columns, trees and other objects are occasionally seen from the coast, sometimes in the water, sometimes in the air and often at the surface of the water. The same object has frequently two images, one in the natural and the other in an inverted position. The name means fairy Morgana, a fairy who was supposed by the ancients to cause the illusion. See MIRAGE.

**Fates** or **Parcae**, in Greek and Latin mythology, the three sisters who spin the thread of



THE THREE FATES

human life. The name *Clotho*, which means *the spinner*, probably belonged originally to all of them, but as poets attempted to describe more precisely the duties of each one, separate names were assigned to them, *Clotho*, *Lachesis* and *Atropos*. *Clotho* spun the thread of life; *Lachesis* decided the fate, and *Atropos* with her great shears cut the thread.

**Father-lasher**, *jah'thur lash'er*, a fish from eight to ten inches in length, belonging to the

## Father of Angling

sculpin genus. The head is large and is furnished with several formidable spines. The fish is found on the rocky coasts of Britain and near Newfoundland and Greenland. In the latter regions it attains a much larger size and is a common article of food.

**Father of Angling.** Izaak Walton, author of *The Compleat Angler*. See WALTON, IZAAK.

**Father of English Prose**, a title sometimes given to King Alfred; sometimes to Roger Ascham.

**Father of Epic Poetry**, a name commonly given to Homer.

**Father of History**, a name given to Herodotus.

**Father of Lies**, Satan.

**Father of Medicine**, a name given to Hippocrates.

**Father of the Faithful**, the name of Abraham, the ancestor of the Jewish nation.

**Father of Waters**, the common name of the Mississippi River.

**Fath'om**, a unit of length in the English system, equal to 6 feet. It is chiefly used in the measurement of the depth of large bodies of water.

**Fatigue**, *fa teeg'*, a condition of the body or of the mind, following prolonged exertion. Fatigue is usually considered in connection with the muscles and nerves, though any organ of the body may become fatigued. Exercise of the muscles is accompanied by the accumulation in the muscular tissue of certain substances whose composition is not well understood, but which have a poisoning effect. Under normal conditions these substances are carried off by the blood, but a long period of exercise so charges the blood with them that it cannot remove them as fast as they accumulate, and fatigue follows. By injecting blood from a fatigued person into the veins of another, the feeling of fatigue is immediately developed in that person's system. Muscular fatigue is characterized by loss of contractile power in the muscle, a sense of weariness and failure to respond to stimuli which in an unwearied condition are easily recognized.

Fatigue in the nerves and brain is characterized by a shrinking of the nerve, as well as by loss of sensibility and mental power. In mental fatigue the powers of perception, memory, reason and feeling require more than the usual stimuli to arouse them to activity and also fail to produce satisfactory results.

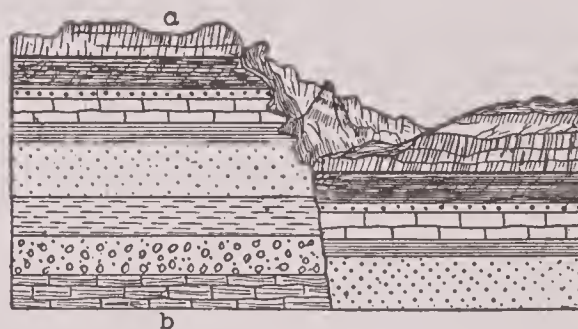
A certain degree of fatigue is beneficial to both body and mind, since, when in this condition,

## Fauns

both the muscular and nervous tissues most readily receive nourishment, through which they acquire increased strength; but fatigue which produces exhaustion should be avoided, especially in the young. See ATTENTION; FEELING; MEMORY; SENSATION; WILL.

**Fat'y Degeneration**, *de jen'ur a'shun*, a condition found in the tissues of the body, in which the healthy protoplasm is replaced by fatty granules. It is a sign of defective nutrition and is common in old age, affecting the muscles, the heart, the arteries, the kidneys and other organs. It is accompanied by great muscular flabbiness and want of energy, although the sufferer may appear fleshy and comparatively well.

**Fault**, in geology, a fracture of strata, accompanied by a sliding down or an upheaval of the deposits on the one side of the fracture to a



A FAULT

greater distance than on the other. The section *ab* in the cut shows the strata in their original position, while the section to the right shows the depression which caused the fault. Faults are frequently met with in coal beds, the miner coming unexpectedly upon an abrupt wall of other strata. The angle this makes with the plane of the bed he is working indicates whether he must look up or down for its continuation on the other side of the fracture. In mines these faults often serve for natural drains.

**Fauna**, a term used to designate the animal life of a certain geographical area or geological age, corresponding thus to the word *flora* as used in botany. Sometimes the region considered is small, sometimes very large; for instance, one may speak of the fauna of Cape Cod or of the fauna of North America.

**Fauns**, rural deities or demigods, who, the Romans believed, inhabited the forests and groves. They resembled the satyrs and were said to have pointed ears, short horns, goat's tails and sometimes even cloven feet. In later times the fauns were considered to be more



nearly human and were sometimes related to the animal world merely by pointed ears or horns.

**Faure**, *for*, FRANÇOIS FELIX (1841-1899), a French statesman, president of the French Republic. He took an active part in the Franco-Prussian War and for his gallant services was decorated with the ribbon of the Legion of Honor. He became a member of the Chamber of Deputies in 1881 and later became under-secretary of state. On the resignation of Casimir-Perier in 1895, Faure was elected president. His administration was safe and conservative, but not brilliant.

**Faust**, *fowst*, JOHANN (about 1485-about 1540), a celebrated dealer in the black art, who lived in Germany. Accounts of him tell that in his sixteenth year he went to Ingolstadt and studied theology, attaining great distinction, but abandoned theology and began the study of medicine, astrology and magic, in which he likewise instructed his companion Wagner, the son of a clergyman at Wasserburg. After Faust had spent a rich inheritance, he, according to tradition, made use of his power to conjure up spirits and entered into a contract with the devil for twenty-four years. A spirit called *Mephistopheles* was given him as a servant, with whom he traveled about, enjoying life in all its forms, but the evil spirit finally carried him off. Even yet Faust and his friend Wagner play a conspicuous part in the puppet shows of Germany, and the legend forms the subject of Goethe's great drama *Faust* and furnishes the libretto for Gounod's famous opera of the same name. As early as 1590 the legend was dramatically treated in England by Christopher Marlowe.

**Faust** or **Fust**, JOHANN (?-about 1466), a German printer, the partner of Gutenberg, the importance of whose discovery he was one of the first to recognize (See GUTENBERG, JOHANNES). There are extant certain works which were published in the printing shop of Faust. The most famous publications which came from his press are the so-called Mazarin Bible and a psalter with beautifully illuminated initials, the first book published with complete dates. See PRINTING.

**Fawcett**, *faw'set*, HENRY (1833-1884), an English politician and economist, educated at Cambridge. After studying law for a time, he turned his attention to economic studies and in 1863 was elected to the chair of political economy in the university at Cambridge. Two

years later he was elected member of Parliament for Brighton and in 1868 he was reelected. He became postmaster-general in the second Gladstone administration and effected many reforms in his department. Among his writings, all of which are strongly in favor of free trade, are *A Manual of Political Economy* and *Lectures on the Economic Position of the British Laborer*.

**Fawkes**, *fawks*, GUY (1570-1606), an English conspirator. See GUNPOWDER PLOT.

**Fayal**, *fi ahl'*, an island belonging to Portugal, one of the Azores. It is of a circular form, about 10 miles in diameter. The climate is good, and the air is always mild and pure. The soil is very fertile, producing in abundance wheat, maize, flax and almost all the fruits of Europe. It exports a great quantity of oranges and lemons. The chief place is Villa Horta, or Orta. Population, estimated at 26,000.

**Feasts**. See FESTIVALS.

**Feather Grass**, *feth'ur gras*, a native of dry places in the south of Europe. The leaves are rigid, pointed and grooved; the awns of the flowers are exceedingly long, feathering to the point. The rush-leaved feather grass is found on prairies in our Western states.

**Feathers**, outgrowths from the skin, which constitute the covering of birds. The feather consists of a stem, horny, round, strong, and hollow in the lower part, called the *quill*, and in the upper part, which is called the *shaft*, filled with pith. On each side of the shaft is a web, composed of a series of regularly arranged fibers, called *barbs*. The barbs and shaft constitute the *vane*. On the edges of the barbs are set the *barbules*, which interlock with those of adjacent barbs and thus give strength to the vane. Feathers are generally divided into two kinds, *quill feathers*, found in the wing or tail, and *plumes*, or *clothing feathers*, generally distributed over the body.

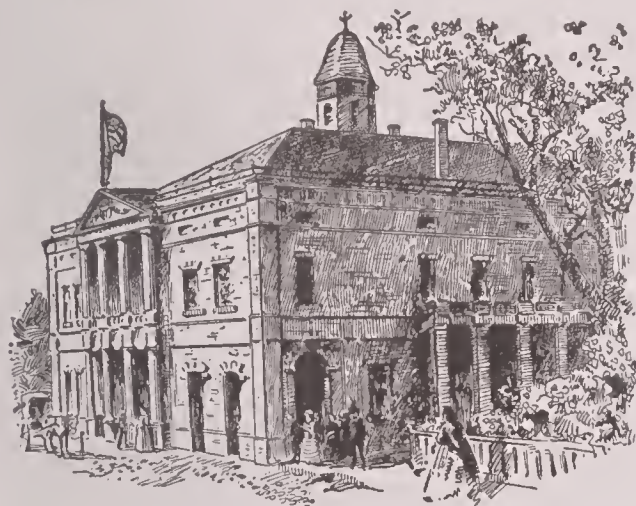
The feathers of birds are periodically changed, generally once, but in some species twice, a year. This is called *molting*. When feathers have reached their full growth, they become dry, and only the tube, or the substance which it contains, continues to absorb moisture or fat. When, therefore, part of a feather is cut off, it does not grow out again; and a bird whose wings have been clipped remains in that situation till the next molting season, when the old stumps are shed and new feathers grow out.

Feathers form a considerable article of commerce, particularly those of the ostrich, heron, swan, peacock and goose. They are used for

plumes and ornaments, for the filling of beds and to a limited extent for making pens. The most expensive feathers are those of the *ferwah*, a rare and beautiful bird of paradise, which frequents the haunts of the tiger and therefore cannot be captured without great danger.

**Feb'ruary**, the second month in the year, having twenty-eight days, except in leap year, when it has twenty-nine. This latter number of days it had originally among the Romans, until the Senate decreed that the seventh month should bear the name of Augustus, when a day was taken from February and added to August to make it equal to July in number of days.

**Federal Hall**, the building in which the first national Congress met in New York City and in which Washington was first inaugurated. The building was erected as a city hall in 1699, but was remodeled for the use of the national



FEDERAL HALL

government. Federal Hall was torn down in 1836, when a sub-treasury was erected on its site.

**Fed'eralist**, **THE**, a collection of eighty-five essays favoring the adoption of the Constitution of the United States, written by Alexander Hamilton, John Jay and James Madison and published by them in newspapers in 1788, over the signature *Publius*. It has been called "the political classic of the United States" and is considered one of the most important eommentaries on the Constitution.

**Federal Party** or **Federalists**, a name assumed by that party in the United States who favored the adoption of the Federal constitution and sought to increase the powers of the national government. They advocated a strong central government, operating upon the people directly. They came into power in 1789 with the election of Washington to the presidency, but were defeated in 1801 and went out of

existence about 1817. The Federal party was the forerunner of the National Republican, Whig and present Republican parties. See **POLITICAL PARTIES IN THE UNITED STATES**.

**Fee'ble-mind'ed**, **EDUCATION OF**. The first attempt made in the United States to educate this class of unfortunates was undertaken in 1848 at the suggestion of Dr. Samuel G. Howe, superintendent of the Perkins Institute for the Blind, Boston. The success was such as to lead to the founding of the Massachusetts School for Idiots three years later. This was the first institution in the country entirely devoted to the education of the feeble-minded. New York followed the example of Massachusetts and was, in succession, followed by Pennsylvania, Ohio, Kentucky and other states, until sixteen states had established homes for the feeble-minded. Of these New York has three, New Jersey two and the other states one each. There are also a number of private institutions devoted to the same work.

The institutions for the education of the feeble-minded differ from those for the education of other defective classes, such as the deaf and blind, in that they must make provision for a continuous residence of all the inmates. The idiotic and the imbecile, being of weak wills, are subject to the temptations and evil designs of all who prey upon them. For this reason all institutions of this kind endeavor to secure large tracts of land, which enable them to afford farm work for most of the men.

The methods of instruction are similar to those employed in the best kindergartens and primary schools. These people are merely children in mind, though adults in body, and many of them take great pleasure in kindergarten occupations, such as are given to normal children of from four to six years of age. The brightest of the pupils learn to read and write, and a few are capable of learning number as far as multiplication. However, the most beneficial work is of an industrial nature. The girls are taught all lines of housework and also fancy needle-work, knitting, crocheting and embroidery. General exercises in music, calisthenics and military drill are used for the purpose of assisting the pupils to control their muscular movements and to work in harmony. The greatest patience on the part of the teachers is necessary, and those engaged in the work usually have special aptitude for it and devote their lives to it.

Every effort is made to make the home



pleasant and to keep the inmates pleasantly occupied and happy. In nearly all cases these efforts are successful.

**Feehan**, PATRICK A. (1829-1902), a Roman Catholic archbishop, born in Tipperary, Ireland, and educated at Maynooth College, Kildare. He came to the United States and was pastor of Saint John's Church, Saint Louis; later he became a priest in the Church of the Immaculate Conception and was made president of the Seminary of Carondelet. As bishop of Nashville, after the Civil War, he made the diocese one of the strongest in the country. In 1888 Feehan was consecrated first archbishop of Chicago. He is the founder of the Catholic Knights of America.

**Feeling**, that state of consciousness which results from the application of a stimulus to the extremity of some sensory nerve. It is the most universal of the senses, since it exists wherever there are nerves, and they are distributed over all parts of the body, though most numerous in the finger tips and on the lines where skin and mucous membrane pass into each other, as the lips. The structures which give the impressions of contact are papillae, or minute elevations of the skin, in which the nerves end, and which are richly supplied with blood vessels. The term *feeling* is also used for a general sense of comfort or discomfort which cannot be localized, and it is thus that the disturbances of internal organs often manifest themselves. In a figurative sense the term is also applied to a mental emotion, or even to a moral conception; thus we may speak of a friendly feeling or a feeling of freedom.

**Feeling**, the emotional element in consciousness. Feeling accompanies all mental acts and constitutes the personal element in them. It is the internal side of all mental activity and that which enables us to join the self to the outside world. It is through feeling that we recognize selfhood, or the difference between you and me. We can understand feeling only through experience. Unless one has felt joy and sorrow, pleasure and pain, all the literature ever written upon these subjects could not make him understand them. Because feeling is such a strong personal element in mental activity, it is difficult to define, and nearly all definitions are vague and unsatisfactory.

**CLASSIFICATION OF FEELINGS.** Feelings are divided into two classes, sensuous and ideal, or formal.

*Sensuous Feelings.* Sensuous feelings are

those arising from certain physical conditions. They are often divided into two divisions, those arising from the general senses, such as hunger, thirst and fatigue, and known as *organic*, and those arising from the organs of special sense, such as the pleasure derived from viewing a beautiful picture or hearing a sweet melody, and called *special*. These feelings must not be confounded with sensations. Sensations furnish the stimuli which arouse the mind to action. We locate the sensation in the object which produces it. Feeling is in the self. I locate the tone of the piano in the instrument, not in the ear; but if I burn my hand on a hot iron, I locate the pain in the hand, and not in the iron. See SENSATION.

*Ideal, or Formal, Feelings.* Ideal, or formal, feelings are those which arise from mental states. In their highest form they are complex, specific, and exercised towards a special object, as admiration for a picture, love for one's parents. They are of two classes, egoistic and altruistic. The *egoistic* feelings are those which center within the self, and for this reason are often termed *selfish*. They should not, however, be confused with selfishness, as that term is ordinarily used. Selfishness means the advancement of the self without regard to the rights of others, but proper self-interests, such as self-respect and desire to improve, are essential to all other interests, and egoistic feelings of this sort are necessary to the right development of character. Altruistic feelings are directed towards objects outside the self, and when highly specialized and complex are termed *emotions*. See EMOTIONS.

**QUALITY OF FEELING.** Feelings are either pleasurable or painful. These qualities are intimately associated with the condition of the nervous system. Pleasure results from working off a surplus of nervous force and energy; children enjoy running and other muscular exercises for this reason. One also enjoys quietude after severe exercise.

Pleasure may be turned into pain. Exercise which in the beginning is enjoyable becomes painful after the system is fatigued. Even the sweetest music grows tiresome if persisted in too long. Pain may likewise be turned to pleasure. A review of one's experiences will reveal the fact that many of the pleasures most enjoyed in adult life are results of what in the beginning were painful practices. Such are skating, riding a bicycle and performing other acts which were learned by effort so strenuous that it was often

painful. Many people acquire a fondness for clams, oysters, olives and other articles of food by practice in eating them. When first eaten, these were usually far from enjoyable.

**INTENSITY OF FEELING.** The intensity of feeling is affected by:

(1) The amount of stimulus. The burn from a red-hot iron is more painful than the sting of a mosquito.

(2) By the prolongation of the stimulus. The effect of a stimulus, which at first produces a keen sense of feeling, by long continuation is perceptibly diminished. Similar effects are produced upon mental states. Continual fault-finding, scolding or praise becomes tiresome and after a time has no effect upon those subjected to it.

(3) By change of stimulus. The feelings are intensified by changing the stimulus so as to excite one set of sensitive organs and then another.

The above principles apply almost entirely to sensual feelings. The intensity of ideal feelings depends largely upon the reverse of these principles. Usually, the longer we dwell upon an idea, the deeper the feelings to which it gives rise. One's love for one's parents, resentment of an insult or interest in a subject grows stronger the more one dwells upon the ideas which give rise to the feeling. Ideal feelings are often vivified by the imagination and are easily recalled by the memory, but they are in the last analysis dependent upon the sensuous feelings for their origin, as one's love for his mother or friends originates in the pleasure derived from their ministrations.

**CULTURE OF FEELINGS.** The proper culture of the feelings is essential to one's development of a right character and to one's happiness. The child can be assisted in the cultivation of his feelings if those who have charge of his education will give heed to the following principles:

(1) During childhood feelings are narrowly egoistic and very intense. Their activity is not subject to the control of the will nor guarded by reason.

(2) Feelings strengthen with use. When one gives way to anger once, it is easier for him to do so again. Likewise, every time one controls his feelings under trying circumstances, he acquires increased power of self-control. Children should be led to acquire the power of self-control early. They should never be subjected to teasing or otherwise unnecessarily irritated. Such treatment often results in the formation

of mental habits which are a hindrance through life.

(3) The intellectual feelings arise from the egoistic. The child's first desire for knowledge is aroused by what he sees others doing, for he wishes to possess the power which will enable him to accomplish the same results. If wisely led in fulfilling this desire, he gradually acquires a love of knowledge for its own sake, and study becomes a pleasure.

(4) The acquisition of knowledge is most satisfactory when the act is accompanied by feeling of a low degree of intensity. Strong emotion prevents careful reasoning; hence, the arousing of undue excitement under the name of enthusiasm is injurious to the work of the school and will seldom, if ever, be resorted to by a judicious teacher.

(5) The esthetic feeling, or love for the beautiful, is an important factor in the development of character and should receive early attention.

(6) The moral sentiment should be trained along with the intellectual and the esthetic. This is accomplished most successfully through concrete illustrations which appeal to the child's love and sympathy, such as fables and tales.

(7) The imagination and the feelings are very closely related. The child's imaginary joys or sorrows may be made to appear stronger than the realities. See **IMAGINATION**, subhead *Culture*.

(8) Happiness is the natural state of life, and nearly all our struggle is for the purpose of gaining happiness. The school and the home should be places of enjoyment, but the most thorough enjoyment is obtained through the wise and healthy use of all the child's powers. The school and home which give this sort of enjoyment contribute most to the child's welfare. See **PSYCHOLOGY**; **WILL**; **METHODS OF TEACHING**.

**Feldspar**, *feld'spahr*, one of the most common minerals, composed of silica, alumina, potash and soda or lime. There are about fifteen varieties, and in some form or other feldspar constitutes the principal part of all igneous and metamorphic rocks (See **IGNEOUS ROCKS**; **METAMORPHIC ROCKS**), such as granite, gneiss, porphyry and greenstone. Common feldspar is white or flesh-colored and is a little softer than quartz. It is usually feldspar that gives granite its peculiar color when polished. Common feldspar is often known as *orthoclase*, and a peculiarly white variety is known as *albite*. In a lime feldspar lime constitutes about one-fifth of its composition.



## Felegyhaza

**Felegyhaza**, *ja'lagsh hah sa*, a town of Hungary, 66 mi. s. e. of Budapest. It has cattle markets and an extensive trade in corn, wine and fruit. Population in 1910, 34,000.

**Fel'lix**, ANTONIUS, a Roman governor of Judea in the time of Paul. Throughout his reign, Judea was greatly disturbed by revolts, and Felix put these down with unnecessary severity. It was Felix to whom Claudius Lysias sent Paul, as described in *Acts* XXIII, 23. Paul's pleading before Felix and Felix's treatment of him are described in *Acts* XXIV.

**Fel'lah**, an Arabian word meaning *peasant*, used for the laboring class in Egypt. The fellahs, or *jellahin*, constitute about three-fourths of the population of Egypt and are mostly the direct descendants of the old Egyptians, although both their language and religion are now that of their Arabian conquerors. They live in rude huts by the banks of the Nile and have suffered much from overtaxation and oppressive rule. See EGYPT.

**Fel'low Ser'vants**. See MASTER AND SERVANT.

**Fellowship**, an honorable position in some universities, both in the United States and England, which entitles the holder, called a *fellow*, to an annual income for a certain period. Fellowships in the English colleges commonly range in value from about \$750 to \$1250 or \$1500 a year, and they all confer upon their holders the right to apartments in the college and certain privileges as to commons, or meals. Six or seven years is the common period during which they may be held, though this may be prolonged in certain circumstances. Fellowships in the United States are usually for one year, though the student may be reelected, and in value are seldom more than \$500.

**Fel'ony**. See CRIME.

**Felt**, a kind of cloth made of wool or of wool and fur matted together, with the aid of moisture and heat, by rolling, beating and pressure. The materials to be felted are carded, are placed in a machine where they are kept moist and are mixed together by a process of beating. They are then passed between rollers, subjected to pressure and united into a compact mass. Felt-making is supposed to have originated in western Asia and the best qualities are still made in Persia and neighboring countries. The use of felt for hats, cloaks, tents and floor mats is very ancient. It is now in general use for hats, clothing, upholstering, carpets and many other articles. Because of its being a nonconductor

## Fencing

of heat, it is much used for roofing, sheathing hot water reservoirs and the like.

**Fe'mur**. See SKELETON.

**Fen**, a marsh or stretch of wet, boggy land, often containing extensive pools. The *Fens*, or the *Fen District*, is a special term for marshy districts in England. Much of the land has been reclaimed at a vast expense. The soil of fen lands is generally black and rich to a depth of 2 or 3 feet.

**Fence**, *fens*, an enclosure round a field or yard. Fences are made of boards, stone, rails and wire. They are used to keep animals in pastures, to protect fields and yards from stray animals and for the purpose of herding flocks. Live fences, or hedges, are made by planting willow, osage orange or other shrubs close together in rows. As the plants grow, their branches interlace and make a strong hedge. Fences around lawns and public parks are often of ornamental patterns. The large farms and ranches in the Western states usually have wire fences. The adoption of these fences has given rise to a large business in the manufacture of wire. Some of this wire contains barbs, which are pointed wires twisted into the main wire at regular intervals. See WIRE.

**Fencing**, *fens'ing*, the art of attack and defense with sword or rapier, no shield being used. It was in Italy in the sixteenth century that the skillful use of the small sword first became common. The art spread to Spain and then to France, where, on account of the prevalence of dueling, it was brought to a high degree of development. The small sword, or rapier, (which was adopted for dueling) has a point, but no edge, and therefore demands the highest degree of adroitness in its use. In the fencing schools the instrument adopted for exercise is called a foil; it has a guard of metal or leather between the handle and the blade, which is made of pliant steel and has a button at the end in place of a point. Fencing is still a favorite form of exercise in gymnasiums and schools in this country, though it has never taken first rank.

Since the introduction of the bayonet, bayonet exercise has become an important department of fencing in the army. In handling the bayonet defensively, the right foot is thrown back and receives most of the weight of the body, the knees are bent, the bayonet is brought to a horizontal position, level with the waist. This is the "guard," and according to the parry to be made the weapon is carried either to the "high" position, pointing upward from the breast, or

## Fenelon

to the "low" position, pointing downward from the breast. In taking the offensive the right leg is straightened, and the left bent forward, without moving the feet from their place. The butt of the rifle is pressed firmly to the shoulder and points straight forward. In "shortening arms," the butt is carried back to the full extent of the right arm, while the barrel (turned downward) rests upon the left arm. The body rests upon the right leg, which is slightly bent, while the left is somewhat advanced.

**Fenelon**, *fa n'lohN'*, FRANÇOIS DE SALIGNAC (1651-1715), an eminent French educator, born in the Province of Perigord and educated in the schools of Cahors and the University of Paris. Soon after completing his education, he became the head of an institution for the instruction of young women. This led him to give special attention to the education of women and to write a treatise on *The Education of Girls*, which was the first systematic work of its kind ever prepared. It was a plea for the general education of women, particularly in the subjects and arts which should fit them for the home and other spheres that women at that time were expected to fill. Fenelon believed that only as women are educated could the moral and educational standard of the community be raised. He therefore considered the education of girls as essential as that of boys. It is his position as a leader in the movement for education of women that gives him prominence among the great educators of the world.

**Fe'nians**, an organization of Irish-Americans, founded in 1861 for the purpose of aiding in the forcible separation of Ireland from England. Their most important organ, the *Irish People*, which was published in Ireland, was seized by the British government in 1865, and many leaders of the movement were arrested; but in the same year a convention at New York determined to establish an independent government in America. This led to an armed movement, which resulted in several attacks on the Canadian frontier in 1866 and an incipient rebellion in Ireland in the following year. Both were quickly suppressed.

**Fen'nec**, a small animal, allied to the dog and fox and sometimes called the *Sahara fox*, as it is a native of that region. It burrows with great facility and lives on small animals and fruits. Its chief peculiarity lies in its very large ears. The fennec is easily tamed.

**Fen'nel**, a fragrant plant of the parsley family, cultivated in gardens. It bears umbels

## Ferdinand

of small, yellow flowers and has finely divided leaves, which give off a pleasant odor. The fruit, or in common language, the seed, is frequently employed in medicine.

**Fer-de-lance**, *fair de lahNs'*, the lance-headed viper, a serpent common in Brazil and some of the West Indian Islands, and one of the most terrible members of the rattlesnake family. It is five to seven feet in length and is of a reddish-yellow brown, marked with a black stripe from the eye to the neck and dark bands across the body. The tail ends in a horny spine, which it scrapes harshly against rough objects, but does not rattle. Its bite is usually fatal.

**Ferdinand**, *fur'de nand*, the name of many European monarchs. Among them may be mentioned *Holy Roman emperors*, Ferdinand III (1608-1657) (See also FERDINAND I; FERDINAND II); *emperor of Austria*, Ferdinand I (1793-1875); *kings of Castile*, Ferdinand I (?-1065), Ferdinand III (1199-1252), Ferdinand IV (1285-1312) (See also FERDINAND V, King of Aragon); *kings of Spain*, Ferdinand VI (about 1712-1759) and Ferdinand VII (1784-1833); *kings of Naples and Sicily* (See FERDINAND II, FERDINAND IV).

**Ferdinand I** (1503-1564), Holy Roman emperor, brother of Charles V of Germany, from whom he received, soon after Charles's accession as emperor, the hereditary possessions of the Hapsburgs in Austria. For many years he was chiefly occupied with a war with the Turks, who supported as king of Hungary John Zápolya, waywode of Transylvania. When Charles V abdicated the imperial throne in 1556, Ferdinand succeeded him. His rule was wise and enlightened, and he introduced a number of reforms.

**Ferdinand II** (1578-1637), Holy Roman emperor, grandson of Ferdinand I. He became duke of Styria, Carinthia and Carniola in 1590 and showed at once a determination to uproot Protestantism from his dominions. This well-known aversion to the Protestant faith was the cause of determined protest from the Protestants of Bohemia, when in 1617 Ferdinand was crowned king of that country (See AUSTRIA-HUNGARY). The result of this opposition to Ferdinand was the outbreak of the Thirty Years' War. In 1619, after the death of Matthias, Ferdinand was made emperor. Ferdinand died before the Thirty Years' War was completed.

**Ferdinand II** (1810-1859), king of the Two Sicilies, succeeded his father Francis I in 1830. The revolution in France in this year had un-



## Ferdinand

settled the minds of men throughout the Continent, and Ferdinand was at first forced to make some concessions to his subjects, but soon recalled them, determining henceforward to make his will the only law. The result was a series of popular outbreaks, culminating in the year 1848, when Ferdinand earned the nickname of King Bomba, from his bombardment of Messina. Despotism was again established by force of arms, and when Ferdinand died his prisons were crowded with the best and bravest of his subjects.

**Ferdinand IV** of Naples, known, also, as Ferdinand I of the Two Sicilies (1751–1825), was the third son of Charles III, king of Spain, whom he succeeded in 1759 on the throne of Naples, on the accession of Charles to the throne of Spain. After the death of Louis XVI Ferdinand joined the coalition against France and took part in the general war from 1793 to 1796; but in 1799, after the defeat of the Neapolitans under General Mack, the French took possession of the whole kingdom and proclaimed a republic. The new republic did not last long, but six years later Ferdinand was again driven from Naples by the French. After the downfall of Napoleon he once more came to power and took the title of Ferdinand I, king of the Two Sicilies. In 1820, in consequence of a revolution, Ferdinand was obliged to swear to support a new and more liberal constitution. The Austrians, however, came to his help and reestablished him in possession of absolute power.

**Ferdinand V** (1452–1516), king of Aragon, who received from the pope the title of *the Catholic*, on account of the expulsion of the Moors from Spain, was the son of King John II. In 1469 he married Isabella of Castile and thus brought about that close connection between Aragon and Castile which became the basis of a united Spanish monarchy and raised Spain to preëminence among European states. After a bloody war of ten years Ferdinand and Isabella conquered Granada from the Moors (1491); but the most brilliant event of their reign was the discovery of America, which made them sovereigns of a new world.

**Fergus, fur'gus, Falls**, MINN., the county-seat of Otter Tail co., 187 mi. n. w. of Minneapolis, on the Red River and on the Great Northern and the Northern Pacific railroads. The city is in an agricultural and lumbering region and has good water power. The various manufactures include flour, woolen goods, wagons, undertakers' supplies, liquors, and foundry and

## Fermented Liquors

machine shop products. It is the seat of the Park Region Lutheran College, Northwestern College and a state hospital for the insane. It was chartered as a city in 1863. Population in 1910, 6887.

**Fermentation**, the conversion of an organic substance into new compounds, by the influence of living organisms (See BACTERIA AND BACTERIOLOGY). There are several kinds of fermentation. The most important from an economic and industrial point of view is the *vinous*, or *alcoholic*, fermentation, in which the sugar in the liquid is converted into alcohol, carbonic acid and glycerine. In *acid* fermentations spirituous liquors become sour and acetic acid is formed. In *putrid* fermentation organic substances undergo various changes and generally set free poisonous gases (See PUTREFACTION). According to the nature of the result produced, fermentation is described as alcoholic, lactic, butyric and so forth. The general course of *alcoholic* fermentation, as seen in brewing and in wine-making, is as follows: After a lapse of time, which may vary much according to temperature and other conditions, the liquid becomes cloudy and gas bubbles arise, increasing in frequency until the liquid begins to effervesce. The temperature of the liquid rises to a higher degree than that of the surrounding air, and on its surface appears a frothy matter known as *yeast*. After a time the climax is passed, the effervescence diminishes and the yeast settles down at the bottom of the liquor, which is now entirely deprived of its sugar and has the characteristic taste and effects of fermented liquors. The fermentation may be checked or stopped by anything which prevents the growth of the bacteria, as, for instance, sulphuric acid or carbolic acid, which act as poisons on the fungus, or by a high or low temperature or by the development within the system of an excess of the products of fermentation. Each species of fermentation is occasioned by a particular microbe, and by no other. *Lactic* fermentation occurs in milk that has been allowed to stand, and it results in the sugar of the milk being converted into lactic acid. *Butyric* fermentation follows lactic fermentation when the latter is allowed to proceed. It is evident that the fermentations set up by bacteria play no small part in the cause and progress of disease. See GERM THEORY OF DISEASE.

**Ferment'ed Liquors**, alcoholic beverages, obtained by the fermentation and clarification of fluids containing sugar. Among the commonest kinds are *wine*, made from the juice of the

## Fern Islands

grape; *ale*, or *beer*, made from an infusion of malt; *cider*, made from apples; *mead*, made from honey; *kumiss*, made by the Kirghiz from mares' milk, and *chica*, made from maize by the South American indians. From all fermented liquors a spirit may be extracted by distillation. See FERMENTATION.

**Fern Islands.** See FARNE ISLANDS.

**Ferns**, the largest and most important family of the cryptogams, or flowerless plants. They are leafy plants, the leaves, or, more properly, fronds, rising from a rhizome or rootstock or from a hollow, tree-like trunk. The fronds, as they appear from the ground, are rolled up at



CRESTED SHIELD FERN

CHRISTMAS FERN

the tip, so that they have somewhat the appearance of a bishop's crozier. There are probably not less than 4500 species of ferns, many of which live in the temperate regions, but the greatest number are found in the tropics, where heat and moisture encourage them to remarkable growth. In the tropical forests the tree ferns rival palms, rising sometimes to a height of fifty to sixty feet and bearing crests of fronds twenty feet in length. Gracefulness and beauty are characteristic of all of them. Most of them grow in the earth, but some are aquatic, and many of the tropical species are air plants. Upon the fronds, in little dots or lines, or occasionally covering the whole leaf-surface, are ripened the minute, brown, dust-like spores. These, falling upon the ground, germinate and produce a minute hair-shaped body, not resembling at all the parent fern. Upon this body are produced the organs from which, in time, springs the commonly recognized fern in its original form, thus making a perfect illustration of the alternation of generations. Some ferns have medicinal qualities, and others afford food, though not in large quantities. While among the most beautiful plants, they are not especially useful and are not in the present age of so great

## Ferris Wheel

relative importance as they were during the period when the coal deposits were formed; then they were the prevailing type of vegetation and grew to enormous size, forming the vast forests which were preserved in our coal deposits.

**Ferrara**, *fer rah'rah*, a city of northern Italy, capital of the province of the same name, 26 mi. n. n. c. of Bologna, in a fertile but unhealthy plain. It is a well-built town and has many remains of its former splendor. The old ducal castle, or palace, now occupied by public offices; several other palaces; the cathedral; the Church of San Francesco; the houses where Ariosto and Guarini lived; the cell in which Tasso was imprisoned, and a monument to Savonarola, who was born here, are some of the interesting features of Ferrara. The city has, also, a public gallery of paintings, a university, founded in 1264, a theological seminary and a library. In the fifteenth century it was famous for its school of painting, one of the best in Italy. Under the rule of the famous House of Este, Ferrara was the capital of a sovereign duchy and rose to a rank of great importance and wealth, having a population of more than 100,000. The popes came into possession in 1598, and after this the city fell into decay. Population in 1911, 95,196.

**Fer'et**, a carnivorous animal, closely allied to the polecat, about fourteen inches in length, of a pale yellow color, with red eyes. It is a



FERRET

native of Africa, but has been introduced into the United States and Europe. It cannot, however, bear cold and cannot subsist even in France, except in a domestic state. Ferrets are used for hunting rabbits and for killing rats and mice. They rarely devour the animals which they attack, but kill them and suck their blood. Their slender bodies enable them to enter burrows, but unless muzzled the ferrets are apt to leave their victims behind after sucking their blood.

**Fer'ris Wheel**, the largest wheel ever constructed, originally erected at the World's Columbian Exposition at Chicago in 1893 and



## Ferrol

named in honor of its inventor, Mr. G. W. G. Ferris, a Pittsburg engineer. It was composed of two wheels, each 250 feet in diameter, connected by rods and struts. At the center of the wheel was an axle 45 feet in length and 32 inches in diameter. The spokes of the wheel were iron rods  $2\frac{1}{2}$  inches in diameter, arranged in pairs 13 feet apart at the crown connection. The wheel carried 36 cars, attached to the circumference, each having a seating capacity of 40 passengers. The total weight of the wheel was about 1100 tons. The wheel was elevated 14 feet above the ground, making its total height 264 feet. The total cost of the wheel was about \$300,000. At the close of the exposition it was taken down and removed to North Clark Street, Chicago, and was later taken to Saint Louis. It was finally demolished.

**Ferrol**, *fair role'*, EL, a fortified seaport of northern Spain, in the province of Coruña, and about 12 mi. n. e. of the town of that name. It is situated on a fine inland bay, connected with the sea by a channel so narrow as to admit only one ship-of-the-line at a time. The chief naval arsenal of Spain, established on a magnificent scale, is here. The manufactures consist chiefly of swords, cutlery and military and naval equipments. Population, 25,281.

**Fer'ry**, a boat for the transportation of passengers and freight across a narrow body of water. The name is also occasionally applied to the route which the boat traverses. Ferries across small streams are usually propelled by hand, either by the use of oars or by means of a rope stretched across the stream. On larger bodies of water steam ferries are employed. These boats are constructed with both ends alike, so that they can move in opposite directions without turning. Ferries for the transportation of passengers to and from large cities, such as New York and San Francisco, can accommodate several thousand passengers, and railway ferries are large enough to transport entire trains across such bodies of water as the Straits of Mackinac, the Detroit River and the Columbia River. Wherever they can be constructed without too great expense, bridges and tunnels are preferred to ferries, since they are less liable to obstruction.

**Ferry**, JULES FRANCOIS CAMILLE (1832-1893), a French statesman and writer. He became a barrister at Paris, but devoted himself almost entirely to journalism. His articles brought him much into notice, and in 1869 he was returned as deputy to the National Assem-

## Fessenden

bly. After the fall of Sedan he became a member of the Government of the National Defense, and in 1872 Thiers appointed him minister to Greece, but he soon resigned. In 1879 he became minister of public instruction, and in 1880 he became premier. He was again premier in 1883. In February, 1893, he was elected president of the Senate, but died the same year.

**Fer'tiliza'tion of Plants.** See CROSS FERTILIZATION; POLLEN.

**Fer'tili'zers**, commercial manures, such as superphosphates and guano, all of which contain a large proportion of plant food. Fertilizers are made from various rocks containing compounds of phosphorus or potash, bones, blood and other refuse from slaughter houses. They vary in quality and in the substances they contain and should be selected with reference to their ability to supply the needs of the soil. Reliable information as to the best fertilizer to use in a given locality can usually be obtained by a farmer from the agricultural experiment station of his state. In most states the law requires the manufacturers of commercial fertilizers to take out a license for the sale of their product and requires a written guarantee for the amounts of potash, nitrogen and phosphoric acid which the fertilizers contain. The experiment stations analyze the fertilizers and determine the truth of the guarantees. In this way the farmer is protected against valueless fertilizers, which might do more harm than good. See MANURES.

**Fes'senden**, WILLIAM PITT (1806-1869), an American statesman, born in Boscawen, N. H., educated at Bowdoin College and admitted to the bar. He settled in Portland, Maine, was elected to the state legislature and in 1840 to Congress as a Whig. He became conspicuous as an anti-slavery speaker and in 1854 was elected United States senator. He delivered a remarkable speech against the Kansas-Nebraska Bill and became at once one of the acknowledged leaders of the anti-slavery party. In 1859, after his reelection to the Senate, he was made chairman of the committee on finance and performed notable service. President Lincoln appointed Fessenden secretary of the treasury after the resignation of Chase in 1864, and immediately he relieved the government's financial distress by issuing bonds in small amounts for popular subscription. He resigned in 1865 and reentered the Senate, taking a prominent part in the debates upon reconstruction. He voted for the acquittal of President Johnson on the impeach-

## Festivals

ment charge and temporarily lost prestige in his party, but soon regained it by his ability and sincerity.

**Fes'tivals** or **Feasts**, certain days or periods consecrated to celebrations in honor of some god or in memory of some great event. Among the Jews, six sacred feasts were prescribed by the Scriptures. The ancient Greeks celebrated the Dionysia, the Eleusinia, the four great national games, the Olympian, Isthmian, Nemean and Pythian (See article on each of the Greek games), and also many local festivals. The Roman festivals were the Saturnalia, Cerealia, Lupercalia and others. Almost all the festivals celebrated by the Roman Catholic Church are commemorative of events in the life of Christ, such as the Sabbath, Easter, Epiphany, Nativity, Christmas, Ascension, Pentecost, Annunciation and Purification. Most of these are kept by the Church of England, with a few additions. The ancient Persians were the only people who had no festivals. Presbyterians and most other Protestant bodies, except Lutherans, recognize no church festival but Sunday, Christmas and Easter. Certain saints' days, formerly printed in red ink in the Church of England calendar, became known as *red letter* days, hence the modern use of the term. The old term, "holy day," has been changed to "holiday," which now signifies a day of merrymaking or of rest.

**Fes'tus**, PORCIUS, Roman procurator of Judea about 61-62 A. D., the successor of Felix. The apostle Paul appeared before Festus, who asked if Paul would consent to be tried at Jerusalem. Paul then appealed to Caesar and was sent to Rome.

**Fetish** or **Fetich**, *je'tish*, a word first brought into use by De Brosses, in his work *Du Culte des Dieux Fetiches* (1760), derived from the Portuguese *feitico*, meaning *magic*. The Portuguese gave this name to the idols of the negroes of the Senegal, and afterward the word received a more extensive meaning. A fetish is any object which is regarded with a feeling of awe, as the possessor of mysterious powers, though these powers be exercised without any consciousness. The fetish may be animate, as a cock, a serpent; or inanimate, as a river, a tooth, a shell. Fetish worship prevails in Guinea and other parts of the west coast of Africa. In addition to the common fetish of the tribe, every individual may have one of his own. To this he offers up prayers, and if they are not heard he punishes his fetish or throws it away or breaks it in pieces.

## Feudal System

**Feudal**, *fu'dal*, **Sys'tem**, that system by which land (a *fief*) is held by a vassal on condition of fidelity, that is, in consideration of services to be rendered to his superior or feudal lord. In the earliest times the relation of superior and vassal did not exist in connection with the ownership of land. Each freeman had his share of the tribe lands, which were held simply on condition of his fulfilling his public duties of attendance at the councils of the mark, or township, and performing his share of military service. The noble had, of course, more land and more influence than the simple freeman, but there was no tie of vassalage between them. The lands held by all freemen, whether noble or ordinary freemen, under this system, were said to be *allodial*, as distinguished from *feudal* lands, which implied service to a superior lord. By the close of the tenth century, however, this system had been considerably changed. The Teutons who overran Gaul and England had necessarily to confer exceptional powers on their leaders; and as they were long in the position of an army in an enemy's country, these powers were continued. Thus it was that kings, before unknown to the Anglo-Saxons, made their appearance immediately after the descent upon Britain.

It was common for a chief or a great man to have a retinue of valiant youths, who were furnished with arms and provisions and who in return served their chief. When conquered lands came to be apportioned and large districts fell into the hands of kings and their subordinates, these men gave certain portions of the territory to their attendants, for life. These estates were called *beneficia*, or fiefs, because they were only lent to their possessors, to revert after their death to the grantor, who immediately gave them to other servants on the same terms. As the son esteemed it his duty, or was compelled, to devote himself to the lord in whose service his father had lived, he received his father's fief; or rather, he was invested with it anew.

By the usage of centuries this custom became a right, and the fief became hereditary. Thus a feudal nobility and a feudal system arose, and for a time it existed alongside of the old allodial system. But gradually the greater security obtained by putting one's self under the protection of a powerful ruler gave the feudal system predominance. The free proprietor of landed property, oppressed by powerful neighbors, sought refuge in submitting to some more powerful nobleman, to whom he



surrendered his land, receiving it back as a vassal. Even the inferior nobility found it to be to their advantage to have themselves recognized as feudatories of the nearest duke or earl; and as the royal power steadily advanced, the offices of duke and earl were always bestowed by the king. Thus the crown became the source of all authority and possession in the country. The land which had once been "folkland," or the land of the people, became the land of the king, from whom all titles to it were derived. Such was the development of feudalism in England, where its centralizing tendencies were strongly reënforced by the conquest under William the Norman. Under him and his immediate successors the power of the king was increased at the expense of the nobles. On the other hand, in Germany, France and elsewhere on the Continent, the disintegrating tendencies of feudalism had full play. In these countries the weakening of the kingly authority encouraged the feudal dukes to gain almost absolute independence, which in France was afterward gradually lost, but in Germany continued to divide the land, almost to our own times, into a number of petty principalities.

Among the chief agencies that overthrew the feudal system were the rise of cities, the change in modes of warfare and the spread of knowledge and civilization. The spirit of the feudal system, grounded on the possession of landed property, was necessarily foreign to cities which owed their origin and strength to industry. The growth of this new social class, with its wealth and industrial importance, contributed more than anything else to the overthrow of feudalism. Even yet, however, the laws relating to land bear the stamp of feudalism. In England, for instance, all land owners are theoretically regarded as tenants holding from some superior or lord, though the lord may be quite unknown. See *SERFS*; *VILLEINS*.

**Feuillet**, *fo yay'*, OCTAVE (1821-1890), a French novelist and dramatist. He had written various novels and comedies before the appearance of *The Romance of a Poor Young Man* raised him to the first rank of the novelists of the day. Among his other numerous novels are *Monsieur de Camors*, *Julia de Trecoeur* and *A Marriage in High Life*. His works have a refined humor and are free, in great part, from the coarseness of the later French school.

**Fe'ver**, a condition accompanying many diseases and characterized by a rise in temperature, a feeling of weakness, loss of appetite,

headache and, frequently, pains in the body and limbs. During the fever the pulse and respiration become more rapid and the skin is dry. A period of decline usually follows the period of rise in temperature; during the lowering of temperature the patient perspires, the pain ceases and sleep usually follows. For a long time fevers were named from the malady which they accompanied; thus, a fever connected with inflammation of the lungs was known as *lung fever*. There are also *typhoid fever*, *scarlet fever*, *yellow fever*, *malarial fever* and numerous others. Fever is usually caused by local inflammation or by the development within the system of poisonous germs which have been taken in from without. It is not a separate disease, as was formerly supposed. What is called *intermittent fever* is one in which the temperature alternately rises and falls. In a low fever the temperature rises but little above the normal, being from 100° to 102°; but when the temperature rises above 103° and as high as 105°, the fever is considered high. Above 105° there is danger of fatality. Fever causes waste of tissue, and upon recovery the patient is left in an emaciated condition and requires some time for recuperation. See *PNEUMONIA*; *SCARLET FEVER*; *TYPHOID FEVER*; *YELLOW FEVER*, and other articles on diseases in which fever is a conspicuous symptom.

**Fe'verfew**, a plant common in waste places and near hedges. It has a tapering root, an erect, branching stem about two feet high, and stalked compound leaves, of a grayish-green color. The heads are small and white, with yellow centers. The plant possesses tonic and bitter qualities and was once supposed to be a potent means of driving away fever.

**Fez**, one of the two capitals of Morocco, 100 mi. e. of the Atlantic and 85 mi. s. of the Mediterranean. It is finely situated on the hilly slopes of a valley, on the River Fez, which divides Old Fez from New Fez. Both parts are surrounded by walls, now in a state of partial decay. The streets are narrow, dark and extremely dirty; the houses are two or three stories high, without windows to the street, but often with handsome interiors and paved courtyards and fountains. There are many mosques, one of them the largest in North Africa. The sultan's palace is large, but is now partially in ruins. Fez is the most important commercial city of Morocco, being the depot for the caravan trade in the south and east and having extensive dealings with Europe. The manufactures consist of

woolen cloaks, silk handkerchiefs, leather, the red Fez caps, carpets and pottery. Fez was at one time famous as a seat of Arabian learning. It was founded in 793 and was the capital of an independent state from 1202 to 1548, attaining a high degree of prosperity. The population, formerly about 400,000, is now estimated at 140,000.

**Fez** (from *Fez*, the name of a city in Africa), a red cap of fine cloth, with a tassel of blue silk or wool at the crown, much worn in Turkey, on the shores of the Levant, in Egypt and in North Africa generally. It is called the *tarbush* in Africa.

**Fezzan'**, a state of North Africa, in the Sahara, forming a depression surrounded by mountain chains and consisting of a great number of small oases. Wheat, barley, millet, figs, melons and other fruits, tobacco and cotton are cultivated, but the chief wealth of the country is in its date palms. With the exception of goats and camels, and in some districts sheep and cattle, few domestic animals are reared. Murzuk is the capital and is the center of the caravan trade, and the only other important town is Sokua. The natives are a mixed race of Arabs, Berbers and negroes. Fezzan is governed by a lieutenant governor under the governor of Tripoli and is dependent, therefore, on Italy. Population, variously estimated at from 50,000 to 150,000.

**Fi'ber**, the thread-like portion of animal and vegetable tissues. Asbestos is also considered a mineral fiber. There are many varieties of fibers, and they are used for a large number of purposes, but when the term *fiber* is used without any qualification, it means *textile fiber*. The most important textile fibers are cotton, wool, silk, flax, hemp, jute and ramie, or China grass. Each of these is described under its appropriate title. Wool and silk constitute the only valuable animal fibers, but under the term *wool* is included that obtained from the sheep, the alpaca, the Angora and other species of goat. Paper fibers include those that can be used in the manufacture of paper, but are not suitable for other purposes. The most important of this class are wood fiber and that obtained from Esparto grass and corn husks. Brush fibers include a number of fibers obtained from tropical plants, usually species of palm, and are used in the manufacture of brushes. Palmetto, tampico and cocoa fibers are the most common fibers for this purpose. Broomcorn is classed as a brush fiber by manufacturers. The finest textile fibers are usually grown in the temperate climate. With

this exception, nearly all those of commercial importance are obtained from tropical or semi-tropical countries. See CLOTH; PAPER; WEAVING.

**Fi'brin**, a peculiar substance found in animals and vegetables. Animal fibrin is the solid matter which is deposited when blood coagulates. In circulating blood it is not solid, but when it is exposed to the air it causes the clot that is seen in wounds. If the wounded blood vessel is small the clot stops the flow of blood. Fibrin is best obtained by switching newly-drawn blood with a bundle of twigs, when the fibrin clings to them in threads. The coloring matter may be washed out with water.

**Fichte**, *fiK'te*, JOHANN GOTTLIEB (1762-1814), a German philosopher, born at Raumenau, in upper Lusatia. He was the son of a ribbon weaver and spent his early years in poverty, but was fortunate enough to attract the attention of a nobleman, who provided for his preparation for the university. His patron died, however, and Fichte was obliged to support himself at the university as a tutor. In course of time he was appointed professor of philosophy in the University of Jena, which position he held for five years, when he was expelled because he did not believe the doctrines of the Church. Subsequently he was five years professor of philosophy in the University of Berlin. He died from typhus fever contracted while taking care of soldiers who were wounded in the war of 1813.

Fichte's philosophy is founded on the idea that each of us creates his world for himself. In accordance with this idea each individual, in order to exist and have activity, must recognize something other than itself—the *notself*. Experience consists in building up varied forms of the *notself*; that is, in constructing an external world. For the sake of common convenience and because of the need of social life, it is the duty of all individuals to make their worlds as nearly alike as possible; hence, we find ourselves accepting as true the same phenomena and objects of sense. The true self, Fichte declared, cannot be the finite personality, but is the great universal self—God—whose will is everywhere expressed through the wills of finite creatures.

Fichte's addresses and writings exerted a powerful influence over the German nation at one of its most critical political periods. His connection with education consists in his annunciation of the doctrine that education must be an unfolding of the whole nature, moral as well as intellectual. He considered the acquisition



## Fiddler Crab

of knowledge the smallest part of education, and believed that the great aim of instruction should be to develop character. To him selfishness was the root of all evil, and his system of education aimed to produce complete and unselfish men. These theories are fully set forth in his *Address to the German Nation*, which, though containing some one-sided views, is of value and is in current use by the best educators.

**Fid'ler Crab**, a common name for a kind of crab, of which one pincher is very much longer than the other and resembles a violin; hence the name. The male has a large claw, which serves as a useful weapon.

**Fief, feef.** See FEUDAL SYSTEM.

**Field, feeld**, CYRUS WEST (1819-1892), an American merchant, brother of David Dudley Field and Stephen J. Field. He was born at Stockbridge, Mass., and started in mercantile business in New York City. After a disastrous failure he acquired a large fortune, and, having obtained a charter giving him exclusive right for fifty years to land ocean telegraphs on the coast of Newfoundland, he organized an Atlantic telegraph company. Attempts to lay cables were made in 1857 and 1858, but without permanent success, and the Civil war having broken out, it was not until July 27, 1866, that a cable was successfully laid, the largest vessel then



CYRUS W. FIELD

afloat, the *Great Eastern*, being used. Mr. Field took an active part in establishing telegraphic communication with the West Indies and South America and was connected with

## Field

various important railroad enterprises. See CABLE, ATLANTIC.

**Field**, DAVID DUDLEY (1805-1894), an American lawyer, born in Haddam, Conn. He graduated from Williams College, early displayed remarkable ability in the law and became especially prominent in the cause of law reform. A code prepared by him was the basis of most of the recent state codes and of one adopted in England. Mr. Field rarely entered politics; he served for a short time in Congress as a Democrat, but staunchly supported President Lincoln.

**Field**, EUGENE (1850-1895), an American poet and humorist, born in Saint Louis, Mo.



EUGENE FIELD

Having lost his mother when he was but seven years of age, he was brought up by a cousin, Miss Mary Field French, of Amherst, Mass. He studied at Williams College, was transferred to Knox College, Galesburg, Ill., and completed his education at the Missouri State University. On attaining his majority he left the university and soon afterward made a tour of Europe. On his return to America he found it necessary to turn his attention to earning a livelihood, and his taste for journalism led him into that profession. From contributor to the Saint Louis *Journal*, he rose to the position of city editor, and he was afterward connected with various papers in Saint Joseph, Kansas City, Denver and Chicago. A series of comic and semi-humorous articles published in a Denver paper brought him favor-



## Field

able notice, and in 1883 he was given charge of a department in the *Chicago Morning News* (afterward *The Record* and *The Record-Herald*). In this capacity he made a reputation as a humorist by his widely-read column, *Sharps and Flats*. He also came into notice as a lecturer. His propensity for practical joking was well known; sometimes he would amuse himself by writing verses, signing a friend's name and after publication criticising them unmercifully.

Field was a true lover of children, and it is probable that he is most widely known as a poet of childhood. But his poems, while most of them appeal forcibly to children, are rather child poems for older people, as their delicate fancy and blended humor and pathos are often too subtle for children. *Little Boy Blue* and *Sometime there ben a lyttle boy* show Field's mastery of the mingling of humor and pathos; and *Secin' Things*, *Jes' Fore Christmas* and *The Limitations of Youth* reveal his sympathy with the heart of a boy. Among his works may be mentioned *The Model Primer*, *A Little Book of Profitable Tales*, *A Little Book of Western Verse*, *Eehoes of a Sabine Farm*, *With Trumpet and Drum* and *The Love Affairs of a Bibliomaniac*.

**Field, KATE** (1840–1896), an American writer and actress, born at Saint Louis, Mo. She completed her education at Boston and made a visit to Europe as correspondent for the *New York Tribune*, the *Chicago Tribune* and the *Philadelphia Press*. Later she became an actress, but met with no great success. In 1890 she started *Kate Field's Washington*, a journal published weekly in Washington, D. C. Among her works are *Haphazard*, *Ten Days in Spain*, *History of Bell's Telephone* and *Life of Feehter*.

**Field, MARSHALL** (1835–1906), an American merchant, born at Conway, Mass. He spent his boyhood on a farm, but at the age of seventeen became a clerk in a dry goods store at Pittsfield, Mass., and removed to Chicago in 1856, becoming a partner in a dry goods house, which in 1865 included the three now famous merchants, Marshall Field, Potter Palmer and L. Z. Leiter. Palmer retired in 1867 and Leiter in 1881, Mr. Field becoming head of the firm, which was thereafter known as Marshall Field & Company and which in the next twenty-five years became the largest wholesale and retail dry goods house in the world. Field was a liberal patron of the University of Chicago and founded the Field Columbian Museum as a permanent repository for interesting exhibits at the World's Columbian Exposition of 1893. By his will

## Fielding

he gave the institution about \$8,000,000. He was director of many corporations, including the United States Steel Corporation, the Pullman Company and the Chicago & Northwestern railway company. The bulk of his vast fortune, estimated at from \$120,000,000 to \$150,000,000, was by his will placed in trust for his two grandchildren, aged eight and twelve, respectively, who will not come into full possession of the property until they are fifty years of age.

**Field, STEPHEN JOHNSON** (1816–1899), an American jurist, born in Haddam, Conn., a brother of David Dudley Field and Cyrus W. Field. He graduated at Williams College in 1837, studied law with his brother in New York City and became his partner. In 1849 he went to California with the gold seekers and exerted notable influence during the period of disorder before the admission of California as a state. After the admission of California he served in the legislature and was influential in the passage of many important laws. In 1857 he became judge of the supreme court of California and two years later became chief justice. President Lincoln appointed him associate justice of the Supreme Court in 1863 and for thirty-four years he served with marked ability. Many of his opinions are important contributions to American constitutional law, notably those in which he dissented from the legal tender, slaughterhouse and income tax decisions. He was a member of the electoral commission of 1876 and voted with the minority in favor of Samuel J. Tilden.

**Field Glass**, a double telescope, in compact form, usually from six to ten inches long. It is an enlarged opera glass. Some of the more recent patterns contain prisms which so reflect the light coming through the object glass as to increase the distance between this and the eyepiece and in this way increase the power of the instrument. See **OPERA GLASS**.

**Field'ing, HENRY** (1707–1754), one of the greatest of English novelists, born at Sharpham Park, in Somersetshire. He was educated at Eton, whence he removed to Leyden; but the straitened circumstances of his father shortened his academical studies, and the same cause, added to a dissipated disposition, turned his attention to the stage. His first play, entitled *Love in Several Masques*, was produced at Drury Lane in 1728, and met with a favorable reception. Numerous other plays quickly followed, but although they were fairly well received at the time, they had not the qualities which insure permanent popularity. In 1737



## Field Officers

he married Miss Craddock, a lady of some fortune, and at the same time, by the death of his mother, became possessed of a small estate in Dorsetshire. His wife's fortune he soon dissipated, and he was again obliged to depend on his pen for his living. In 1742 appeared the first of his great novels, *Joseph Andrews*, which he had at first conceived as a burlesque of Richardson's *Pamela*. It met with instant success, and was followed by *Jonathan Wild*, a satirical work, which had little interest beyond its own day. In 1749 Fielding's masterpiece, *Tom Jones*, appeared, and this was followed two years afterward by *Amelia*. The chief merits of Fielding as a novelist are wit, humor, correct delineation of character and knowledge of the human heart. He drew from a varied experience of life, which he reproduced with an artistic realism entitling him to be considered, far more than Richardson, the creator of the English novel.

**Field Officers**, in the army, those competent to command whole battalions—majors, lieutenant colonels, colonels—as distinguished from those intrusted with company duties, as captains and lieutenants.

**Field of the Cloth of Gold**, the name given to a plain in France, in the present Department of Pas-de-Calais, celebrated for the meeting (June 7 to June 20, 1520) between Henry VIII, of England, and Francis I, of France. The diplomatic results of the meeting were little or nothing, and the event is now memorable only as a grand historic parade. The splendor of the festivities and the gorgeousness of the trappings of the attendant nobles were what gave to the place its name.

**Fields**, JAMES THOMAS (1817–1881), an American publisher and author. By reason of his great sympathy with young authors and his keen literary judgment, he became an intimate friend of Longfellow, Whittier, Bryant, Hawthorne, Holmes, Emerson, Lowell and many other writers, and his firm, which was known at different times as Ticknor & Fields and Fields, Osgood & Co., published most of their books. Mr. Fields was editor of the *Atlantic Monthly* from 1862 to 1870. After retiring from business, he published a volume of poems and also *Yesterdays with Authors*, a charming book of reminiscences of the author's acquaintance with Thackeray, Hawthorne, Dickens, Wordsworth and others.

**Field Sports**. See ATHLETICS.

## Fifteen Decisive Battles

**Fi'ery Cross**, among the Scottish Highlanders, a cross of light wood, the extremities of which were set afire and then extinguished in the blood of a goat. This cross was sent from place to place as a summons to arms and was also known as the *Crantara*.

**Fife**, a small wind instrument, resembling the flute. Its tube is closed at one end and is pierced with six finger holes. It sometimes has one key. The player blows into a hole near the closed end of the tube, and the music produced is extremely clear and shrill. The fife is commonly used with the drum. Its ordinary compass is two octaves, from D on the fourth line of the treble staff upward.

**Fifteen Decisive Battles**. The English historian Sir Edward Creasy, in *The Fifteen Decisive Battles of the World*, describes the following as the battles which have been instrumental in changing the course of history:

(1) MARATHON (490 B. C.). In this, the Greeks under Miltiades defeated Cyrus, the Persian king, and thus rendered impossible the conquest of Europe by Asiatic peoples. See MARATHON.

(2) SYRACUSE (413 B. C.). In this the Athenians were overthrown and the extension of Greek rule was checked. See SYRACUSE.

(3) ARBELA (331 B. C.). Alexander the Great by his victory over Darius made possible the introduction of European civilization into Asia. See ARBELA.

(4) METAURUS (204 B. C.). This battle was the defeat of Hannibal by the Romans and brought about the destruction of Carthage.

(5) ARMINIUS (9 A. D.) defeated the Roman general Varus, destroyed his legions and thus overthrew Roman dominion in Germany. See ARMINIUS.

(6) CHALONS (451). Here the defeat of Attila by the Visigothic king Theodoric saved Europe from devastation at the hands of the Huns. See CHALONS-SUR-MARNE.

(7) TOURS (732). In this battle Charles Martel defeated the Saracens and checked the spread of Mohammedanism in Europe. See TOURS.

(8) HASTINGS (1066). In this battle William the Conqueror defeated Harold and won for himself the English throne and for the Normans the control of England. See HASTINGS, BATTLE OF.

(9) ORLEANS (1429). In this battle Joan of Arc, by her defeat of the British and the relief of the town, made possible the libera-

## Fig

tion of France from British dominion. See ORLEANS.

(10) ARMADA, The (1588). The defeat of the Spanish Armada was fatal to Spanish hopes in England. See ARMADA.

(11) BLENHEIM (1704). Here the duke of Marlborough by his defeat of the French army checked the ambitious schemes of Louis XIV of France. See BLENHEIM.

(12) PULTOWA (1709). Here Peter the Great defeated Charles XII of Sweden and firmly established the Russian empire. See CHARLES XII.

(13) SARATOGA (1777). The defeat of the English under General Burgoyne by the American troops under General Gates turned the tide of the Revolution in favor of the colonists. See SARATOGA, BATTLE OF.

(14) VALMY (1792). The French won the victory against the armies of the allies under the duke of Brunswick, and the continuation of the French Revolution was made possible. See VALMY.

(15) WATERLOO (1815). Napoleon I was finally overthrown by the allied armies under the Duke of Wellington. See WATERLOO, BATTLE OF.

Historians differ somewhat in their choice of the most decisive battles of the world's history, but the ones mentioned above have certainly strongly influenced the course of history.

**Fig**, a tree belonging to the mulberry family. It is indigenous to Asia Minor, but has been naturalized in all the countries round the Mediterranean. It grows from fifteen to twenty, or even thirty, feet high, and in congenial climates it bears two crops in a season, one in the early summer, from the buds of the last year; the other (which is the chief harvest) in the autumn, from the buds on the spring growth. In reality, the fig is the pulpy end of a stem, which has grown around and nearly enclosed the real fruits, which we call the seeds. When ripe, figs are dried, and sugar forms on the outside; they are then packed in boxes for market. The best are raised in Smyrna, but good figs are produced all around the Mediterranean. Figs can be successfully grown anywhere in the United States south of the fortieth parallel, but as an industry fig-growing is most extensive in California, whose figs are now said to rival those of Smyrna. To the same genus belong a number of tropical plants which are both curious and valuable. Some are trailing vines,

## Figurate Number

while others are great trees. East India rubber is made from the sap of a fig tree.

**Figaro'**, a dramatic character first introduced on the French stage by Beaumarchais in his comedies, *The Barber of Seville* and *The Marriage of Figaro*. Figaro is a barber remark-



FIG  
Female flowers and fruit.

able for his shrewdness and dexterity in intrigue. Mozart's *Marriage of Figaro* and Rossini's *Barber of Seville* are adaptations of these plays. The name is also well known as that of a journal published in Paris.

**Fighting Fish**, a small fish related to the perch family, a native of the southeast of Asia. In Siam these fishes are kept in glass globes, as we keep goldfish, for the purpose of fighting, and an extravagant amount of gambling takes place about the results of the fights. When the fish is quiet, its colors are dull, but when it is irritated it glows with metallic splendor.

**Fighting Joe**, a nickname given to Gen. Joseph Hooker.

**Fig'urate Num'ber** or **Fig'ural Num'ber**, a number whose units can be arranged in the form of a geometric figure. In the accompanying table the numbers in the second row are called *triangular* numbers, because their units may be arranged in equilateral triangles. The numbers in the third row are called *square* numbers, those in the fourth, *pentagonal*. In



the same way, according to a fixed law, series of hexagonal and heptagonal numbers may be derived. In general, these are called polygonal numbers.

I.—1	2	3	4	5	6
II.—1	3	6	10	15	21
III.—1	4	9	16	25	36
IV.—1	5	12	22	35	51

**Figures of Speech**, a term used, in its widest sense, to mean a use of words in any but their literal meaning. Such figures may be divided into three classes, figures of rhetoric, figures of etymology and figures of syntax. *Figures of rhetoric* differ from the others in being figures of thought, rather than of grammatical form, and are used more constantly in poetical than in prose composition, as when skillfully used they add greatly to the beauty of language. The two most common figures of rhetoric are the metaphor and the simile (See METAPHOR; SIMILE). The *figures of etymology* have reference to the forms of words and consist largely in the use of such forms as *o'er* for *over* and *twixt* for *betwixt*, while *figures of syntax* are variations in the construction of sentences. The most common figure of syntax is the ellipsis, by which is meant the omission of some word, phrase or clause which is essential to the grammatical completeness of a sentence, but which is omitted with the intention of making an expression more forcible. This figure is common in ordinary speech, and every such expression as *Here!* for *Come here!* *Less noise!* for *Let there be less noise!* is an example of ellipsis.

**Fiji**, *fe'jee*, **Islands**, or **Viti**, *ve'tee*, **Islands**, an island group forming a colony of Great Britain, in the South Pacific Ocean, east of the New Hebrides. The entire group, which was discovered by Tasman in 1643, comprises altogether 254 islands and islets, 80 of which are inhabited, with a total area of about 8000 square miles. Only two of the islands are of large size, Viti Levu, or Naviti Levu, and Vanua Levu, or Vuya. The islands are mostly of volcanic origin, and the surface is mountainous. The soil is extremely fertile and produces cocoanut palms, breadfruit, bananas, pandanus, oranges, taros, yams, sweet potatoes, maize, tobacco and sugar cane. Timber trees, including the chestnut, are plentiful; sandal wood is now scarce. The chief occupation is agriculture. From 1866 onward the influx of European settlers from New Zealand and the Australian colonies gradually brought the trade of Fiji into importance, and repeated applications were

made to the British government, both by the settlers and the king, Thakombau, to annex the islands. At length, in 1874, this was done, and the Fiji Islands were made a crown colony, under a governor, assisted by an executive council and legislative assembly. Native chiefs take part in the administration, the old customary law being still largely adhered to. Since the annexation the prosperity of the colony has been remarkable. The chief article of export is sugar; the next is copra, the dried kernels of the cocoanut. The other important exports are cotton, molasses and coffee. The capital is Suva, on the south coast of Viti Levu. The island of Rotumah, to the north, was annexed to Fiji in 1881. The inhabitants are of middle stature, strongly built, with a complexion between copper color and black, and for many years have been Christians. Population in 1911, 139,541.

**File**, a steel tool for abrading or smoothing purposes. Files were known before 1093 B. C., for they are mentioned in *I Samuel* XIII, 21. Files are graded by shape, size and fineness of cut. Three distinct "cuts" of file are recognized, *single-cut*, *double-cut* and *rasp*. These cuts have different degrees of coarseness, designated by terms as follows:

*Single-cut*: rough, coarse, bastard, second-cut, smooth. *Double-cut*: coarse, bastard, second-cut, smooth, dead smooth. *Rasp*: coarse, bastard, second-cut, smooth.

The terms *rough*, *coarse*, *bastard*, *second-cut*, *smooth* and *dead smooth* have reference only to the coarseness of the teeth; the terms *single-cut*, *double-cut* and *rasp* refer to the character of the teeth. In single-cut files, the coarse grades of which sometimes are called *floats*, the teeth are unbroken, the *blanks*, that is the pieces of steel of which the files are made, having had but a single course of chisel cuts. Double-cut files have two courses of chisel cuts crossing each other. Rasps differ from single- and double-cut files in that the teeth are disconnected, each being made with a single pointed tool, called a *punch*. A *safe edge* is a side of the file which has no teeth on it and is used for filing in a corner, without cutting more than one of the work surfaces. A file is *taper* when it is thinner toward the point; *parallel* when it is of the same dimensions throughout, and *blunt* when it is between a taper and a parallel.

Most of the files used to-day are machine-cut. The blanks are fed into the machine, and the feed is so regulated that a new cutting surface is presented at regular intervals to the

## Filefish

chisel. For years inventors tried to make a machine which would cut files to equal the hand-cut files, but the cuts were too regular, both as to distance and height. This put all the work on the part of the file presented first to the work. But the machines used in the United States not only give the file that irregularity of cut necessary, but raise burs which cannot be told from those of hand-cut files.

**File'fish**, a name given to certain fishes, from the fact that the dorsal spine is granulated like a file. One species, a common inhabitant of the Mediterranean, which grows to the length of two feet, has the power of inflating its sides at pleasure. The best-known filefish is the *barnacle eater*, found north of England. It is of a tawny color and is often seen in aquariums. These fishes are related to the trigger fishes.

**Fil'ibus'ters**, a name given to those who, as private citizens of one country, interfere in the affairs of another, especially in time of war. The name has been chiefly used to refer to those citizens of the United States who endeavored to establish settlements in the Spanish islands and colonies in Central America, and also to those who had illicit intercourse with the insurgents during the rebellions of the Spanish colonies. Among the most noted of the filibusters was William Walker, who made three expeditions to Nicaragua (1855, 1857 and 1860).

**Filipinos**, *fil e pe'noze*. See PHILIPPINE ISLANDS.

**Fil'let**, in architecture, a small space or band, like a narrow ribbon, used with moldings; *a, a, a* (see figure) are examples of fillets, both in classic and Gothic architecture.

**Fill'more**, MILLARD (1800-1874), an American statesman, thirteenth president of the United



FILLETS

States, born at Summer Hill, N. Y. The poverty of his parents prevented his having a good education, and at fifteen he was an apprentice to a wool carder, with whom he remained four years. Meantime, he spent every spare moment in reading and study. A lawyer named Wood became interested in him, and when Fillmore was nineteen took him into his office to study law, placing at his disposal funds for the prosecution of his studies. Fillmore devoted part of his time to conducting a school. In 1821 he removed to Buffalo, where, in 1823, he was admitted to the bar. In 1829 he was chosen as an Anti-Mason representative in the state legis-

## Filter

lature and procured the passage of a bill abolishing imprisonment for debt in New York. In 1832 he became a Whig member of Congress and was reelected several times. He was the author of important legislation, notably the tariff of 1842 besides being conspicuous as a



MILLARD FILLMORE

debater. In 1847 he was elected comptroller of New York; in 1848, vice-president of the United States, and in July, 1850, by the death of President Taylor, he became president. He held this office until 1853. The passage of the Omnibus Bill, or Compromise of 1850 (See COMPROMISE OF 1850), was the most notable event of his administration and was due largely to his sympathetic assistance. In 1856 he was the candidate of the Know-Nothings for president, but received only the electoral vote of Maryland. See UNITED STATES OF AMERICA, sub-head *History*.

**Fil'ter**, a device for taking dirt and other impurities out of liquids. Spring water is purified by being filtered through beds of sand and gravel in the earth; but rain water and that obtained from lakes and rivers need to be filtered before using. A common filter is made of two vessels; one within the other, or one above the other. The vessel used for the filter is partially filled with alternate layers of powdered charcoal and sand, with a layer of coarse gravel on top. The bottom of this vessel may



## Finch

be porous, or it may contain an opening through which the water can run. The water is poured into the filter and slowly flows down through the sand and charcoal and collects in the other vessel, from which it can be drawn for use. Charcoal made from bones, called animal charcoal, is the best purifier for cleansing water, as it removes not only the solid matter but any gases which the water may contain, as well. The Pasteur filter, so common in city houses, consists of a vessel of very thin porous earthenware, enclosed in a metallic tank, which can be fastened to the faucet or water pipe. The pressure forces the water through the filter, and the pure water is drawn from a spigot connected with the tank. Waterworks of many cities have large filters connected with them. Filters used by chemists are made of paper, especially prepared for the purpose.

**Finch**, a general name for any individual of a large family of small seed-eating birds, inhabiting all parts of the globe and distinguished by their sharply pointed, conical and usually strong bills, suitable for crushing seeds and other hard objects. There are about 550 species, which have been classified into several sub-families and many genera. Though most of them are sober in their coloring, some are particularly brilliant, and many of them are fine singers. See CANARY; CHAFFINCH; GOLDFINCH; BULLFINCH; BUNTING; CROSSBILL; GROSBEAK; LINNET; SPARROW; SNOWBIRD, and articles on numerous other species.

**Find'lay**, OHIO, the county-seat of Hancock co., 44 mi. s. of Toledo, on the Blanchard River and on the Lake Erie & Western, the Cincinnati, Hamilton & Dayton, the Big Four and several other railroads. The city is in a region having many oil and natural gas wells, besides deposits of coal, building stone, lime, sand and gravel. The varied industries include machine shops, oil refineries and manufactures of glass, brick and tile, carriages, furniture and other articles. Findlay was incorporated in 1837. It has a public library and a hospital and is the seat of Findlay College, which is under the auspices of the Church of God. Population in 1910, 14,858.

**Fine**, a pecuniary penalty, exacted either in punishment of, or in compensation for, an offense, whether committed against an individual, in contravention of the laws of the community, or against the community itself.

**Fine Arts**, the arts which appeal to the sense of beauty and whose object is to produce

## Finland

pleasure. Of the fine arts, music is the first and purest, because the sources of pleasure in it are purely artistic. It tells no story, represents no fact, but simply gratifies the sense of beauty and excites pleasure. In the modern sense the fine arts are only the imitative arts, which appeal to us through the eye, and the term is often restricted to painting and sculpture. See ARCHITECTURE; ENGRAVING; PAINTING; SCULPTURE.

**Fin'gal's Cave**, a famous natural cavern in the island of Staffa, one of the western islands of Scotland. It extends 227 feet from its mouth inward and is flanked by lofty basaltic columns, beautifully jointed. The height from the top of the arched roof to the mean level of the sea is 66 feet, the breadth at the entrance is 42 feet and the width at the end of the cave is 22 feet.

**Fin'ial**, in architecture, the terminal ornament of pinnacles, canopies, spires or pediments. Finials were generally carved to resemble foliage and were made of stone, wood or metal. They reached their highest development of form and design in the thirteenth century in France and England.

**Fin'land**, formerly a Russian grand duchy but independent by proclamation after the bolsheviki revolution in Russia in 1917, when that new power declared itself in favor of the policy of "self-determination of peoples" everywhere. It embraces a large part of Russian Lapland. There are many small islands and rocks off the coast, which make navigation extremely difficult and dangerous. The surface is diversified with hills, and in the north are mountains, peaks of which rise as high as 4000 feet. The soil is fertile, producing extensive forests of oak, pine and fir and considerable rye, oats and potatoes. The most valuable exports are the products of the forests, timber, pitch, tar and resin. The principal minerals are iron and copper; granite is extensively quarried. The inhabitants are mostly Finns and Swedes, with a few Lapps, Russians and Germans. Up to the twelfth century the Finns lived under their own chiefs and were pagans. Their conversion to Christianity took place about the middle of that century, after their conquest by the Swedes. In 1721 the part of Finland which formed the province of Viborg was secured to Peter the Great by treaty and the remainder was conquered from the Swedes in 1809. The religion, laws and liberties of the country have, however, been preserved, and Finland is perhaps the freest part of the Russian Empire. The established religion is Lutheran,

but there is complete religious freedom for other bodies. What the new government will eventually be was impossible to tell in August, 1918, for the country was yet sadly disturbed and the Finns were coping with revolutions. German influence was paramount; the provisional government, in February, 1918, signed a peace treaty with Germany, by which the latter country secured many concessions. The Finns felt it the part of wisdom to invite a German prince of the house of Hohenzollern to occupy the throne. Population, 1910, 3,120,264. Of these only 1794 were Germans.

**Finland**, GULF OF, a great arm of the Baltic, 250 or 260 miles long and from 10 to 70 miles wide, stretching from west to east between Finland on the north and the Russian governments of Esthonia and Petrograd on the south. Its waters are only slightly salt. It contains numerous islands and has several excellent harbors and strong fortresses. Navigation is possible, but is impeded by the rocks and sandbanks and the ice in winter. The ports on this gulf are Kronstadt, Viborg and Helsingfors.

**Finns**, a race of people inhabiting the northwestern part of European Russia, especially the grand duchy of Finland. The typical Finns are of low stature but of strong build, with round head, low, arched forehead, flat features, with prominent cheek-bones and oblique eyes. Their language belongs to the northern division of the Turanian family of languages and is most nearly allied to the languages of the Lapps and Hungarians. It is agreeable to the ear, rich in vowels and diphthongs, copious and uncommonly flexible. Finnish literature is valuable chiefly for its rich stores of national poetry (See KALEVALA). A great impulse has been given to the cultivation of the language in modern times. It is now recognized as an official language, side by side with Swedish, and is becoming more and more the vehicle for imparting instruction. In many of the higher educational institutions for both sexes in Finland, the Finnish language is used. Works on science and history, as well as poetry, have been written in Finnish in recent years; a great Finnish-Swedish dictionary has been published, and there are now a considerable number of newspapers. The center of this literary life is Helsingfors.

**Fins**, the projecting, wing-like organs which enable fishes to balance themselves and which assist in regulating their movements in the water. The fin is a thin, elastic membrane, supported by bony or cartilaginous rays. The breast fins

are never more than two and are placed immediately behind the gill. In a state of rest these fins are drawn in parallel with the body and have the apex toward the tail. The terminal fins are located under the throat and belly and point downward and backward. They are smaller in general than the breast fins and sometimes have long appendages. The fins of the back point upward and backward and vary in number from one to four, to which are sometimes added several little fins, as in the case of the mackerel. Other fins are placed vertically near the tail. The tail fin, which terminates the body and serves as a rudder, assists in propelling the fish. The shape, location and character of the fin vary with different genera.

**Fin'sen**, NIELS RYBERG (1861-1904), a Danish scientist, the discoverer of the method of curing lupus, or tuberculosis of the skin, and other skin diseases, with light rays. In 1890 he graduated from Copenhagen University and began at once the research which led to his wonderful discoveries. The value of his work was so well recognized that the Danish government assisted him to establish Finsen's Medical Light Institute, in a suburb of Copenhagen, where he labored to perfect his methods of applying light to the treatment of disease. In 1903 Professor Finsen received the Nobel medical prize.

**Fiord** or **Fjord**, *fyord*, a geographical term (of Scandinavian origin) applied to long, narrow and very irregularly-shaped inlets of the sea, such as occur on the coast of Norway. Similar inlets of the sea are presented in the sea lochs and firths of the coast of the British Isles, and also in the fiords on the southwest coast of the South Island of New Zealand, where the scenery is singularly imposing. Fiords often seem to owe their origin to the action of glaciers in remote epochs of the earth's history.

**Fir**, *fur*, the name of a tree belonging to the family Coniferae. The fir, which is closely related to the pine, resembles the spruce in general appearance and is distinguished by its sharp, flat leaves, which are dark green on the upper surface and light on the under, and which grow in rows on opposite sides of the branch. A typical tree is beautifully cone-shaped, and in young specimens the lowest branches touch the ground. There are a number of species, most of which are found in cold climates throughout the eastern and western hemispheres. In the United States the *balsam fir* is the common eastern species, found in abundance from Hudson



## Firdausi

Bay to Virginia and westward as far as the Great Lakes and Minnesota. This tree seldom grows to more than thirty feet in height and produces an inferior timber. Canada balsam is prepared from the sap of this tree, and the buds have a fragrant and soothing odor. The fir of the Pacific states is known as the *silver*, or *lowland*, fir, a gigantic tree, often reaching a height of 300 feet and furnishing white soft wood that is used for boxes, barrels and for some building purposes. The *red fir* of the same region is of much the same character. In 1910 nearly 2,000,000,000 board feet of fir timber were cut on the Pacific coast. Its value was about \$18,000,000.

**Firdausi**, *feer dow see'*, or **Firdusi**, *feer doo-see'*, ABUL KASIM MANSUR (about 935-1020), the greatest epic poet of the Persians. At the request of the Sultan Mahmud, Firdausi undertook to write an epic on the history of Persia, the sultan promising him a piece of gold for each verse. Firdausi devoted a great many years to this work and produced a historical poem of 60,000 couplets, entitled *Shah-Namah*, or *Book of Kings*, containing the history of the Persian rulers from the beginning of the world to the downfall of the Sassanian dynasty (641 A. D.) and consisting properly of a succession of historical epics. The sultan, prejudiced against Firdausi by the poet's enemies, gave him only a piece of silver for each verse, and Firdausi retaliated with one of the bitterest and severest satires ever penned. The *Shah-Namah* is one of the finest Asiatic poems. No other work in the Persian language can be compared with it. It abounds in rich imagery, contains many passages of splendid poetry and is of great interest to historians and ethnologists. A French translation of the *Shah-Namah* by Mohl, with the Persian text, was published by the French government, and an abridged translation has been published in English.

**Fire.** In the mythology of most nations there is recognized a time when man was without a knowledge of fire, and the various legends of the discovery of fire are interesting and varied. The uses and dangers of fire, and to some extent the means of controlling it, have been generally understood from a very early period. The symbolic and superstitious uses of fire are numerous and have been, or are, common to all races. In ancient times fire was regarded as one of the four elements of which all things are composed, the other three being air, earth and water.

**Fire Alarm'**, an apparatus for announcing the breaking out of a fire. Simple fire alarms

## Firecrackers

are often placed in large buildings. These are usually automatic and are so constructed that a rise in temperature beyond a given point closes the circuit which operates an electric signaling apparatus; but the fire alarm in most common use is that connected with the fire departments of cities. This consists of a central office, or signal station, containing the batteries and signal bells, which are connected with alarm boxes stationed at different places in the city. The alarm boxes are of iron and are closed with two doors. When necessary to "turn in" an alarm, the box is opened, and the handle, which is either a crank or a hook, is pulled down. This turns a wheel which closes the circuit and rings the gong in the central office and another in the engine house in the district in which the alarm box is located. The gong gives a number of strokes corresponding to the number of the box from which the alarm is sent in, and at the same time a recording apparatus in the central office indicates the number of strokes. If additional alarms are required, they are sent from the central office.

**Fire'arms.** See ARMS AND ARMOR; CANNON; GUN; MACHINE GUN; MUSKET; PISTOL; REVOLVER; RIFLE; SHOTGUN; SMALL ARMS, and other kindred titles.

**Fire'ball**, 1, A ball filled with powder or other combustibles, intended to be thrown among enemies and to injure by explosion, or to set fire to their works. 2, A popular name applied to a certain class of meteors, which exhibit themselves as globular masses of light, moving with great velocity and infrequently passing unbroken across the sky until lost in the horizon. They differ from ordinary meteors, probably, more in volume and brilliancy than in any other distinctive characteristic. They are not to be confounded with another class of meteors that explode in their passage and appear to let fall a dull red body to the earth. See METEOR.

**Fire'bird.** See BALTIMORE ORIOLE.

**Fire Clay**, a compact kind of clay, consisting chiefly of silica and alumina, capable of sustaining intense heat and used in making fire bricks, gas retorts and crucibles, and for lining blast furnaces. Fire clay belongs to the coal formation and always forms a stratum immediately below each seam of coal. See CLAY.

**Fire'crackers**, toy bombs, consisting of cylinders of paper, enclosing an explosive powder, which is ignited by a fuse projecting from one end. The Chinese or Hindus were the first

## Fire Damp

makers of fireworks, and probably gunpowder or something like it was burned on festival days several thousand years ago in China. Americans began to make firecrackers only a few years ago, but at the present time they are turned out by the millions. They range in size from about  $\frac{1}{2}$  an inch to more than 1 foot in length, and from  $\frac{1}{8}$  of an inch to 3 inches in thickness. The tube of the cracker is made of strawboard, the fuse is spun cotton, soaked in a mixture of starch and gunpowder, and the explosive is a mixture of powdered charcoal, bichromate of potash and chlorate of potash. They should be handled with the greatest care, should not be touched after lighting and should be made to explode at a considerable distance from any person. Lock-jaw and blood poisoning frequently follow as the result of wounds caused by explosions. In cases of injuries immediate steps should be taken to cleanse the wound, and antiseptic substances should be applied under the direction of a physician.

**Fire Damp**, the name given by miners to light, carbureted hydrogen gas, marsh gas or methane. It appears to be generated by the decomposition of partially carbonized coal. It is sometimes very abundantly evolved in coal mines and is frequently productive of the most dreadful results, for if mixed with air it is highly explosive and takes fire readily from an exposed flame. In many cases it has occasioned the death in one great explosion of hundreds of men employed in a mine. The safety lamp affords the chief protection against the fatal effects of this gas. See DAVY, SIR HUMPHRY.

**Fire Department**, the organization and appliances for extinguishing fires. The fire department of a large city is a highly organized body, under the control of a chief and several assistants. It is usually divided into companies, each under the immediate control of a captain. One or more of these companies occupy a fire station, where also the fire engine, hose cart and other material are kept. When an alarm of fire sounds, the horses are released and the doors to their stalls are opened by electrical devices. The horses are trained to take their places at the pole, and the harnesses which are suspended over these positions are released and instantly clasped in their proper places. Within a few seconds from the time the alarm is sounded, the men have reached the engine and hose cart by sliding down poles from the loft above, and the company is ready to start. On reaching the scene of the fire the engine is connected by hose

## Fire Extinguisher

with the hydrant of the waterworks, and other hose is stretched from the engine to the burning building. Through this, water is pumped upon the flames. Ladders, water towers and chemical engines are also used.

In some villages and small cities so-called *volunteer* departments are maintained. The members donate their services, though they are often granted a remission of part of their taxes in return. Though employed in ordinary occupations, they assemble at the alarm of fire and get the apparatus into position and manage the fighting of the flames. See FIRE ENGINE.

**Fire Engine**, an engine for throwing water to extinguish fires. A fire engine is simply a strong force pump, with the necessary machinery for working it and supplying it with water. The older types of fire engines were worked by hand, and the majority of the fire company gave their attention to working the pumps. Now nearly all fire engines are operated by steam. The engine consists of two pumps attached to a steam engine and the whole mounted upon a wagon. The water is carried to the fire through rubber tubes about four inches in diameter, called *hose*. Several hundred feet of hose usually accompany every engine. The largest fire engines will pump 900 gallons a minute and throw a stream of water as high as a four or five story building, while the smallest size will throw about 300 gallons a minute. In small cities and towns waterworks have replaced the old hand engine, but in cities the steam engine is found necessary.

**Fire Escape**, a contrivance for enabling people to escape from the upper part of a building when it is on fire. Many patterns of fire escapes have been placed in use during the last half century. The most common pattern consists of an iron ladder, attached to the building, with a platform or balcony at every story. Fire departments use systems of extension ladders, as well as tubes made of sailcloth, through which persons can make an easy descent. All states have stringent laws requiring all factories and buildings of a public nature to be equipped with fire escapes.

**Fire Extinguisher**, an apparatus for extinguishing fire by means of water charged with gases that kill flame. The fire extinguisher consists of a cylinder which will hold four or five gallons. When the cylinder is charged it is filled with water, into which is put about a pound of common cooking soda. A bottle holding about half a cup of sulphuric acid is fastened



## Firefly

in a frame which is attached to the cup. When the cup is screwed in place the extinguisher is ready for use. When the extinguisher is wanted the bottle is emptied by pulling a rod which passes out through the cup. The acid acts upon the soda in the water and sets free a large quantity of carbonic acid gas, which creates a pressure and forces the water out through small holes at the bottom of the cylinder. Fire extinguishers are useful in extinguishing small fires. A larger pattern, sometimes called the chemical fire engine, usually furnishes a part of the equipment of the fire department of large cities.

**Fire'fly**, a name given in an indefinite way to any winged insect whose body gives off light in the darkness. The fireflies of the United States are beetles, which may be seen flying in great numbers over wet and swampy places in summer nights. Some of the tropical fireflies are very brilliant (See **CLICK BEETLE**). The larvae of many fireflies give off light and are known in the United States as glowworms.

**Fire Insurance.** See **INSURANCE**.

**Fireless Cooker**, a device for cooking food with the minimum expenditure of heat. It consists of a box which can be tightly closed, and which is stuffed with hay or some other like substance, space being left for one or more covered kettles. The food is boiled for a few minutes, until it is heated through, and is then covered and placed in the cooker, which keeps in the heat and allows the food to cook slowly. Meats which are not the more tender cuts; vegetables which require long cooking, as cabbage or dried beans; hard cereals, as rice or cracked wheat, are improved by cooking in a fireless cooker, and are far more economically prepared.

**Fire'proofing.** See **BUILDING**.

**Fire Ships**, old vessels filled with combustibles and fitted with grappling irons, to hook enemies' ships and set them on fire. This ancient device has been frequently tried in modern warfare, though it can never be of much effect when employed against modern armored ships.

**Fire'works**, preparations in various shapes of gunpowder, charcoal, sulphur, saltpeter and other substances, used for display at times of public rejoicing. They may be divided into simple hand pieces, such as squibs, crackers, rockets and Roman candles, and arranged "pieces," which are contrived with much skill and ingenuity to represent, when ignited, various devices and pictures. See **FIRECRACKERS**.

## Fisheries

**Fire Worship.** See **GHEBERS**; **PARSEES**.

**First Aid to the Injured.** The first and absolutely essential thing to do in case of serious accident or injury is to summon a reliable physician, but often before his arrival steps may be taken which will be of very great benefit to the patient. These will be found described in special articles upon the emergencies which are of most frequent occurrence. Thus, the antidotes for common poisons are described in the article **ANTIDOTE**. See, also, **BURNS AND SCALDS**; **ARTERY**; **VEINS**; **DROWNING**; **SUN-STROKE**; **WOUNDS**; **FAINTING**.

**Fish**, **STUYVESANT** (1851- ), an American capitalist and railroad president, born in New York, the son of Hamilton Fish, former secretary of state. He was educated at Columbia and entered the office of the Illinois Central railroad company in 1871. He rapidly rose to influential positions, meantime serving in various capacities with other roads, especially in the South. In 1887 he became president of the Illinois Central railroad. He was appointed a member of the monetary commission created by the conference in Indianapolis in 1897.

**Fish Ber'ry.** See **COCCULUS**.

**Fish Commission, UNITED STATES, THE.** See **FISH CULTURE**.

**Fish Cul'ture.** Germany, Spain and other countries maintain fish culture establishments under government supervision, and from them millions of eggs and small fish are annually placed in the streams and lakes. In the United States fish culture is under the general supervision of the United States Fish Commission, which maintains hatcheries in different parts of the country, looks after the preservation of fish in waters not under the control of the states, such as the deep waters of the Great Lakes, and sees that such waters are properly stocked with fish. Besides the United States Fish Commission, nearly every state maintains a state commission, whose duty it is to see that the waters within the state are kept stocked with native fish. These commissioners often maintain state hatcheries. The national government and the various state governments have enacted stringent laws regulating the time and manner of taking fish, and it is a part of the duty of these various commissions to see that these laws are enforced. The United States commission also gives attention to the culture of oysters, lobsters and other shellfish valued for food.

**Fish'eries**, a term which includes all the industries concerned in the capture of the

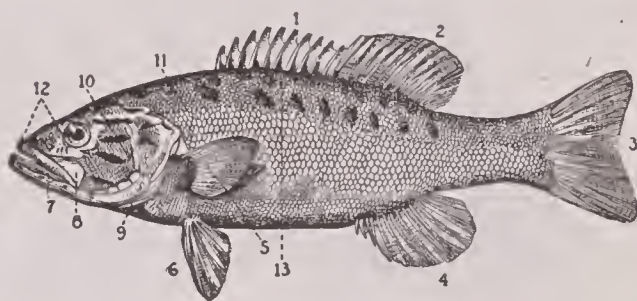
## Fishes

inhabitants of fresh and salt water for food and other economic purposes. It is thus applied to the procuring not only of fish proper, but also of other animals and products found in the sea, such as sponges, corals, pearls, shell-fish, turtles, whales and seals. The most important of fresh water fisheries are those of the salmon. The whitefish and sturgeon are also important. Trout, eel, pike and perch are among the other valuable fresh water fishes. Sea fisheries, including the herring, cod, haddock and other fishes, are prosecuted in a variety of ways. Fisheries have generally been considered so important a factor in national wealth that governments have been careful to protect and encourage them in various ways. The right to various fisheries has often been a matter of international dispute, negotiation and treaty. Fisheries belonging to particular governments, especially inland fisheries in lakes and rivers, are also frequently protected by laws relating to the mode and time of capture, which vary with the particular circumstances. The countries whose fishing industries produce the most valuable returns are the United States, Great Britain and Canada. The banks of Newfoundland are among the richest fishing grounds in the world and are largely frequented by United States, Canadian, English and French fishermen. The North Sea also yields a very rich harvest to the fishermen of all the surrounding coasts, especially in herring, cod, haddock and flatfish (See DOGGER BANK). The fisheries of the United States are located along the Atlantic coast, in the Great Lakes and upper rivers of the country and along the Pacific coast. The cod are the most important fish taken from the Atlantic; the whitefish, sturgeon and the species of trout known as Michigan herring are the most important fish taken in the Great Lakes, while the Pacific coast is noted for its salmon fisheries, which are of great value. See COD; SALMON; FISH CULTURE; FISHES.

**Fish'es** are the lowest of the five classes into which the great branch of vertebrate animals is divided. Fish live in water and breathe the air contained therein by means of gills (see GILLS). They have cold red blood and a simple heart. Their limbs are represented by fins; their bodies are generally covered with scales overlapping one another, and in form they are usually lengthened, compressed and tapering toward both extremities, so that they present little resistance to the water. The vertebrae are loosely articulated, so that the fish can bend

## Fish Hawk

their bodies about in almost any direction. They possess, in their air bladder, or *sound*, an organ peculiar to themselves, which they are able to fill or empty at will. The skeletons of some families of fishes are not of bone, but of a strong, thick cartilage. Geology shows that there have been many thousands of species of fish now wholly extinct, but yet about 9000 species survive, distributed throughout almost all the waters of the earth. Those in temperate or tropical waters are more brilliantly colored and strikingly marked than the inhabitants of colder waters. In most species the colors



SMALL-MOUTHED BLACK BASS

- |                                 |                           |
|---------------------------------|---------------------------|
| 1. Spiny portion of dorsal fin. | 7. Mandible or lower jaw. |
| 2. Soft portion of dorsal fin.  | 8. Maxillary.             |
| 3. Caudal fin.                  | 9. Opercle.               |
| 4. Anal fin.                    | 10. Cheek and Preopercle. |
| 5. Pectoral fin.                | 11. Lateral fin.          |
| 6. Ventral fin.                 | 12. Snout.                |
|                                 | 13. Depth.                |

increase in intensity and beauty during the breeding season, much as the plumage of a bird grows bright. The eggs of fish are laid in shallow water and are usually left uncared for, though some species gather the eggs in nests and protect and care for their young. Millions of eggs are laid by a single fish, but the young are such helpless little things that relatively few survive. See FISHERIES; ANGLING; FISH CULTURE; and many articles on separate species.

**Fishes, DEEP SEA.** Before 1872, when the British government sent out the Challenger expedition, deep sea fishes were not known to any great extent, although the explorations of a few scientific expeditions of earlier date had taught scientists that there were remarkable and astonishing forms of animal life in the ocean depths. The absence of sunlight, the low, even temperature, the enormous pressure and the absence of plants all tend to establish in the denizens of these seas many peculiarities.

**Fish Hawk**, a well known bird of prey, also called the *osprey*, *fishing hawk*, *fishing eagle* and *sea gull*. It is found on both the European and American continents, near the shores of the sea or on great rivers and lakes. It nests in high trees and cliffs and lives on fish,



## Fishing

which it captures by pouncing upon them as they swim near the surface. The general body color is a rich brown, and its tail is banded with brown and white, or in old birds is pure white. The head and neck are whitish in their upper portions, and a brown strip extends from the bill down each side of the neck. The under



OSPREY

parts of the body are whitish, but the legs have a bluish cast. The fish hawk is about two feet in length and measures four feet from tip to tip of its wings. It is said that the American bald eagle often pursues the fish hawk and frightens it into dropping its prey, which is thereupon seized and eaten by the pursuer.

**Fish'ing.** See ANGLING.

**Fishing Laws.** See GAME LAWS.

**Fiske, JOHN** (1842-1901), an eminent American historian, lecturer and philosopher, born at Hartford, Conn. As a boy Fiske was noted for his precocity; he could read and enjoy Shakespeare and Milton at eight; and before he was thirteen he knew Vergil, Tacitus, Horace and other Latin authors well. He graduated from Harvard and from the Harvard Law School, but he did not practice law. From 1869 to 1879 he was connected with Harvard University in one way or another, occupying the positions of lecturer on philosophy, instructor in history and assistant librarian. In 1884 he became professor of American history in Washington University, Saint Louis.

Fiske was early attracted by the writings of Darwin and Herbert Spencer and became one of the strongest advocates of the doctrine of evolution. One of his earliest works, *Outlines of Cosmic Philosophy*, was based on this doctrine. For more than thirty years he expounded these theories through his lectures and writings

## Fitch

and is considered to have contributed more than any other American writer towards making the ideas of these great thinkers understood by the people.

Fiske ranks among the foremost historians of his time, and by his exhaustive study he contributed much of value to American history. His style is exceptionally clear and attractive, and his writings are sympathetic. In some respects, however, his work is not authoritative, on account of his patriotic prejudices. His best-known historical works are *The War for Independence*, *The American Revolution*, *The Critical Period of American History*, *The Beginnings of New England*, *The Discovery of America* and *A United States History for Schools*. He also wrote *Old Virginia and Her Neighbors*, *Dutch and Quaker Colonies in America*, *Civil Government of the United States*, *New France and New England*, *American Political Ideas Viewed from the Standpoint of Universal History*, *Darwinism and Other Essays* and *Myths and Myth Makers*, besides other essays.

**Fiske, MINNIE MADDERN** (1865- ), an American actress, born in New Orleans. Her parents were connected with the theater and she was on the stage from her early childhood. She achieved a real success when she was but thirteen years old. Three years later she appeared as a star, but although she won some success she gave little evidence of her real talent. After her marriage to Harrison Gray Fiske in 1890, she retired from the stage for three years, and on her return to it was at once successful. She played in her husband's *Hester Crewe*, Ibsen's *A Doll's House*, and in 1897 in *Tess of the D'Urbervilles*, which created a great sensation. Among her plays since that time have been *Little Italy*, *Frou-Frou*, *Magda*, *Becky Sharp*, *The Unwelcome Mrs. Hatch* and *Leah Kleschna*. Becky Sharp is considered her greatest rôle.

**Fisk University**, an institution for the higher education of colored people, situated at Nashville, Tenn. The university was founded by the American Missionary Society and Western Freedmen's Aid Association in 1865. It has five buildings, a gymnasium and athletic ground. It has an income of \$50,000, 500 students, 32 instructors and 10,000 books.

**Fitch, CLYDE (WILLIAM)** (1865-1909), an American playwright, born in New York and educated at Amherst College. His first play was *Beau Brummel*, which was produced by

## Fitch

Richard Mansfield in New York City in 1890 with great success. Besides a large number of original dramas, chiefly of modern society, he adapted many plays from the French and German. Of his original plays, *Nathan Hale*, *The Climbers*, *Barbara Frietchie*, *Captain Jinks of the Horse Marines*, *Her Own Way*, *The Woman in the Case*, *Her Great Match*, and *The City* proved popular. Of his adaptations, the best known are *Sapho*, *The Masked Ball* and *Cousin Billy*.

**Fitch, JOHN** (1743-1798), an American inventor, born in East Windsor, Conn. At the outbreak of the Revolutionary War he became a gunsmith in the American army and after this was employed in several surveying and trading expeditions in the West. He later came to Pennsylvania, where in 1785 he completed his first model of a steamboat. His second boat made a successful trial trip two years later on the Delaware. In the summer of 1790 a boat built by him made regular passenger trips between Philadelphia and Burlington, with a speed of eight miles an hour. In spite of the success of his invention, Fitch was unable to get funds to carry out his plans, and he went to France, where he was to construct boats for the government, but he was unsuccessful in getting the appointment and returned to the United States. In 1817 a committee of the New York legislature decided that he was inventor of the steamboat. See SHIP.

**Fitchburg, MASS.**, one of the county-seats of Worcester co., 50 mi. n. w. of Boston, on a branch of the Nashua River and on the Boston & Maine, the New York, New Haven & Hartford and other railroads. There are granite quarries in the vicinity, and the manufactures include cotton and woolen goods, firearms, engines, electrical appliances, machinery and tools. The Fitchburg State Normal School is located here. Population in 1910, 37,826.

**Fitzgerald, fits jer'ald**, EDWARD (1809-1883), an English poet, best known as the translator of the *Rubaiyat* of Omar Khayyam from the Persian. He was of Irish ancestry and was born in Suffolk, where he spent his life in quiet seclusion. He was educated at Trinity College, Cambridge, and early devoted himself to literary pursuits and the companionship of close friends. His extreme modesty prevented him from publishing many admirable works and doubtless deterred him from writing, except under the greatest inspiration. The first of his translations, for which he is particularly famous,

## Five Forks

was published in 1853. The *Rubaiyat* appeared in 1859 and was practically his last great effort. It is a very free translation, but reproduces the spirit of the poem with remarkable faithfulness, while the beauty and perfection of the English lines are now generally acknowledged.

**Fiume, fyoo'me**, a seaport town of Austria-Hungary, a free town of the Hungarian kingdom, picturesquely situated on the Gulf of Quarnero, in the northeast extremity of the Adriatic Sea. Among the interesting buildings are an ancient cathedral, a townhall, a naval academy and a theater. There are three large harbors, and the city is the seat of all the commerce of Hungary. The town has distilleries, manufactures of soap, tobacco and paper, and important fisheries. Population in 1910, 49,806.

**Five Civilized Tribes**, the name commonly used by the government to designate five tribes of Indians which formerly lived in tribal condition in the Indian Territory. They were for a long time practically independent republics, under the care of the United States, but in 1898 a law was passed establishing a commission to allot the lands of their reservations to individual Indians. To settle and divide an estate of 20,000,000 acres of land among 75,000 heirs was a tremendous task. The work of the commission, however, proceeded rapidly, and in 1901 the final roll of the citizens in the Seminole nation was approved. The Creek roll was practically complete at the same time, and a very considerable allotment of lands had been made to the Seminole. Each citizen in the Seminole nation received \$308.76, and the lands were distributed so their value should be as nearly as possible this amount. By March, 1906, the work was completed, the Five Civilized Tribes disappeared, and their members became like other ordinary citizens of the United States. See CHEROKEE; CHICKASAW; CHOCTAW; CREEKS; SEMINOLE.

**Five Forks, BATTLE OF**, a battle of the Civil War in America, fought April 1, 1865, about 11 miles southwest of Petersburg, in Dinwiddie County, Virginia. A Federal force of about 25,000 under General Sheridan opposed a somewhat smaller Confederate force under General Pickett. It was the result of efforts on the part of both Grant and Lee to secure control of the village of Five Forks, which commanded the only railroad communication between the South and Petersburg and Richmond. Lee stationed a small force at Five Forks and resisted a strong attack by Sheridan on March 31, but on the following day the Federals, after receiving



reënforcements, defeated the Confederates, who lost about 5000 men. The Federal loss was about 1000. The result of this battle compelled Lee to evacuate Petersburg and practically led to his surrender.

**Five Nations**, **THE**, a name given to a confederacy of the Iroquoian tribes, living along the Saint Lawrence and in New York and Pennsylvania. Later the Tuscarora were added to the confederacy, and in consequence they were sometimes known by the English as the Six Nations. Their organization, according to their traditions, had been established by Hiawatha, and his work was so thoroughly done that even to-day, notwithstanding all the changes that have been brought about by the white man, the confederacy still exists among the survivors. The Huron, though of Iroquoian stock, were not members of the league, but were continually at war with it. See CAYUGA; HURON; MOHAWK; ONEIDA; ONONDAGA; SENECA; TUSCARORA; IROQUOIAN INDIANS.

**Fives**, a kind of game with a ball, originally called hand tennis, played on a level piece of ground, with a smooth wall, against which the ball is struck after its first rebound from the ground. See HANDBALL.

**Fixed Stars**, those stars which appear to remain always at the same distance from one another and in the same relative position. The name comprehends, therefore, all the heavenly bodies, with the exception of the planets, their moons and the comets. See STARS.

**Fjord**, *fyord*. See FIORD.

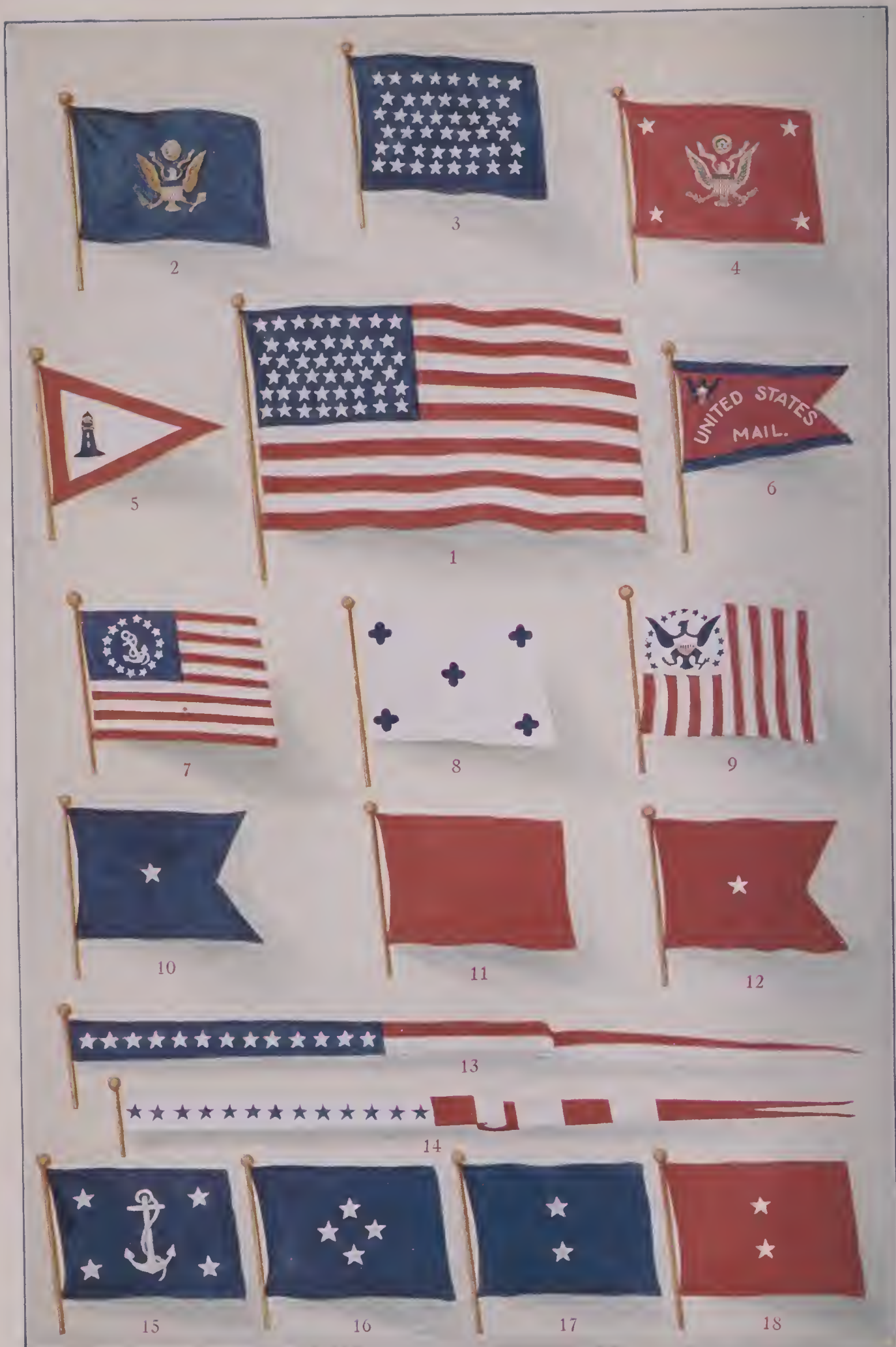
**Flag**, a piece of cloth on which certain figures or devices are painted, impressed or wrought, borne on a staff, or pole, and usually employed to distinguish one company, party or nationality from another. In the army, a flag is the banner by which one regiment is distinguished from another. Flags borne on the masts of vessels not only designate the country to which they belong, but also are made to denote the rank of the officer commanding the ship. In the United States navy blue flags, with four, three and two white stars, are borne at the main, fore and mizzen, by the ships of admirals, vice admirals and rear admirals, respectively. The commodore's flag, abolished in 1905, was a broad blue pennant with one white star, borne at the main when the commodore was acting commander in chief. Any officer commanding a vessel, except one on board of which a flag or broad pennant may be borne, flies a narrow pennant at the main. When powder is taken on board, a red flag is

hoisted at the fore. The president's flag is blue and bears the United States coat of arms; the secretary of the navy shows a flag of blue, bearing an anchor in the center of a group of four white stars. A yellow flag is the quarantine flag. Flags of truce are white, and on water they are met by a boat or vessel from the senior officer's vessel, in charge of a commissioned officer, having a white flag. A flag reversed is a sign of distress. To lower, or *strike*, the flag is to pull it down or take it in, out of respect or submission to superiors. To strike a flag in an engagement is a sign of yielding. A sign of mourning is to hoist the flags only part of the height of the masts; if on land, half the height of the staff. Flags are the recognized means of signaling at sea, where, by international codes, ships may communicate on every necessary subject. Each nation, too, has its own private code. *Dipping* the flag is hauling it down a few feet and then running it up again. Salutes are made by dipping. In the United States navy, when the flag is hoisted at 'colors,' or hauled down at sunset, the officers and men are required to salute. See colorplate *National Flags*, also FLAG, UNITED STATES.

**Flag**, UNITED STATES. The birthday of the United States flag was on June 14, 1777, when the Congress "*Resolved*, That the flag of the Thirteen United States shall be thirteen stripes, alternate white and red, and that the union be thirteen white stars on a blue field." At this time there was no suggestion as to how the stars should be arranged or how many points each should have. Paul Jones displayed an ensign on the *Serapis* (1779) at Texel, in which the stars had eight points, and the stripes were blue, red and white. The first flag is said to have been made by Mrs. Elizabeth Ross, flagmaker, at 239 Arch St., Philadelphia. The French navy first saluted the American flag February 14, 1778. The first recorded naval engagement under the flag was between the *Ranger* and the *Drake* (English), April 24, 1778. At Fort Stanwix (now Rome), N. Y., upon the enemy appearing unannounced on Aug. 3, 1778, a mosaic flag was hastily constructed out of strips of sheets and bits of scarlet cloth sewed together, while out of Capt. Abraham Swartout's camlet cloak was constructed the field for the stars. The stars and stripes were associated with all the glory of the last days of the Revolution and waved in prophetic splendor over Yorktown. The first time colors were unfurled over a foreign country was when Capt. John Rathburne took possession of







## UNITED STATES FLAGS

- |                          |   |                          |                                   |
|--------------------------|---|--------------------------|-----------------------------------|
| 1, National Ensign.      | 6, United States Mail.                                | 11, Powder Flag.         | 14, Revenue Pennant.              |
| 2, President's Standard. | 7, Yacht Ensign.                                      | 12, Commodore's Broad    | 15, Secretary of the Navy.        |
| 3, Union Flag and Jack.  | 8, Naval Dispatch.                                    | Pennant, second in rank. | 16, Admiral's Flag.               |
| 4, Secretary of War.     | 9, Ensign of the Revenue Marine.                      | 13, Navy Pennant.        | 17, Rear Admiral, senior in rank. |
| 5, Lighthouse Service.   | 10, Former Commodore's Broad Pennant, senior in rank. |                          | 18, Rear Admiral, second in rank. |



## FLAGS OF THE NATIONS

1, Germany.  
2, Belgium.  
3, Russia.  
4, Austria-Hungary.

5, France.  
6, Italy.  
7, Norway.  
8, Netherlands.

9, United States.  
10, Great Britain.  
11, Canada.  
12, Australia.

13, Japan.  
14, China.  
15, Sweden.  
16, Panama.

17, Mexico.  
18, Brazil.  
19, Argentina.  
20, Chile.





## Flagellants

Fort Nassau, New Providence Islands. The American colors were first shown in a British port by the ship *Bedford*, of Nantucket, reporting at the customhouse, London, Feb. 6, 1783. The national emblem during the War of 1812 had fifteen stars and fifteen stripes, the number having been increased by an act of Congress on the admission of Vermont and Kentucky, 1795. Eben Appleton, Yonkers, N. Y., grandson of Colonel Amstead, has in his possession the flag whose "broad stripes and bright stars" inspired the *Star Spangled Banner*, written by Francis Scott Key. On the admission of Indiana in 1816, a committee was appointed to inquire what changes were necessary to be made in our national emblem. At the suggestion of Capt. S. C. Reid the number of stripes was reduced to the original thirteen, and the stars increased to represent the number of states. By the following enactment, April 4, 1818, the present status of our flag was fixed: "*Resolved*, That from and after the 4th of July next, the flag of the United States be thirteen *horizontal stripes*, alternate red and white; that the union have twenty stars, white in a blue field; that on the admission of every new state one star be added to the union of the flag, and that such additions shall take effect on the 4th of July next succeeding such admission."

The *revenue* flag of the United States differs somewhat from the national emblem. Outside of American waters, revenue vessels may bear the national ensign in addition to the revenue flag. The revenue flag was created by an act of Congress, March 2, 1799; it consists of sixteen perpendicular stripes. The union bears the arms of the United States in dark blue on a white field, and in 1871 thirteen blue stars were substituted. The "stars and bars" of the Confederacy was adopted in 1861. One or two changes were made in this flag, and at the close of the war the stripes ran perpendicularly instead of horizontally. The stripes were three, red and white, and the stars nine. See FLAG.

**Flagellants**, *flaj'el lants*, the name of a sect in the thirteenth century, who maintained that flagellation was of equal virtue with baptism and other sacraments. To obtain the mercy of God and to appease his wrath against the vices of the age, they walked in procession with shoulders bare and whipped themselves till the blood ran down their bodies. Rainer, a hermit of Perugia, is said to have founded the order in 1260. He soon found followers in nearly all parts of Italy, who went about in thousands

## Flamboyant

from country to country, begging alms and led by priests bearing banners and crosses. For centuries they formed a sort of intermittent order of fanatics, frequently reappearing here and there in times of extraordinary distress.

**Flageolet**, *flaj'o let*, a small, wind instrument of music, played by means of a mouth-piece and finger holes. The tone produced is shrill, resembling that of the piccolo, but is softer in quality, and the range is two octaves.

**Flag Officer**, in regular navy, a general distinguishing title for an admiral, vice admiral and rear admiral, who have the right to carry flags indicating their rank at the mast head.

**Flag of the Prophet**, the sacred flag of the Mohammedans. It was originally composed of the turbans of the Koreish, captured by Mohammed; but the black curtain that hung in front of the door of Ayesha, one of Mohammed's wives, was afterward substituted. It is preserved in the seraglio at Constantinople. The carefully guarded banner unfolded at the commencement of a war is not the real sacred flag, though it is commonly believed to be so.

**Flag of Truce**, a white flag which, when exhibited by one of two opposing armies, indicates a desire to cease hostilities temporarily for purposes of communication. It has assumed a sort of sacred character, and firing upon a flag of truce is now considered among civilized nations a just cause for severe retaliation. The flag is in the nature of a message from the highest commanding officer of one force to the corresponding officer of the other. The one to whom the message is sent can refuse to receive it, and the messenger after being warned not to proceed farther, is not considered immune from attack if he disobeys this order. It is considered a violation of international law, also, to use the flag of truce for any other purpose than direct and immediate communication, and any attempt to secure private information by means of it is punishable by the severest measures.

**Flamboy'ant**, a style of Gothic architecture common in France from the fourteenth to the sixteenth century, at about the same period as the Perpendicular style in England. It was distinguished by the waving and somewhat flame-like tracery of the windows, doorways and panels. The pillars are often



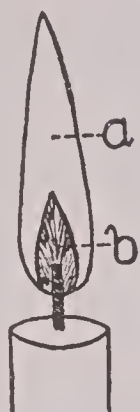
FLAMBOYANT TRACERY



## Flame

cylindrical, either plain or with a few of the more prominent moldings of the arches continued down them, without any capital or impost intervening. The arches are usually two-centered, sometimes semicircular, and in later examples elliptical. See TRACERY.

**Flame**, a blaze rising from a burning body, or any inflammable gas in a state of visible combustion. Flame is attended with great heat and sometimes with the evolution of much light, but the temperature may be intense with little light, as in the case of the flame of burning hydrogen. The luminosity of flame depends upon the presence of extremely small particles of solid matter (usually carbon) or of dense gaseous products of combustion. The flame of a candle consists of a dark colored cone containing gases that look dark because they are not burning, a white envelope surrounding the cone and consisting of particles in a high state of combustion, and a second and outermost cone of yellow color, in which particles of matter are heated to the point of burning. When the pressure of the gas producing the flame is so great that it is all but flaring, it is found that certain sounds will cause the flame to alter its shape, thus producing *sensitive flames*.



FLAME  
a, brilliant white envelope; b, dark inner cone.

**Fla'men**, among the ancient Romans, the name given to any priest devoted to the service of one particular deity. Originally there were three priests so called: *Flamen Dialis*, consecrated to Jupiter; *Flamen Martialis*, sacred to Mars, and *Flamen Quirinalis*, who superintended the rites of Quirinus, or Romulus. The number was ultimately increased to fifteen, the original three, however, retaining priority in point of rank, being styled *Majores*, and elected from among the patricians while the other twelve, called *Minores*, were elected from the plebeians.

**Flamin'go**, a strange looking bird, whose body is rather smaller than that of the stork, but which, owing to its great length of neck and leg, stands from five to six feet in height. There are several different species found in Mediterranean and tropical countries, all more or less red in color, but varying in size. They migrate in V-shaped flocks. Their necks are extremely long, slender and flexible and their big, naked bills are bent abruptly down, as if broken near the middle. In feeding, the bird stands nearly

## Flammarion

erect, thrusting its neck downward and burying its bill and perhaps its head in the water, with the top of the bill downward. It then sways its head from side to side, causing currents of water to pass back and forth through the bill, where fine horny projections strain out the seeds and the small animals that are stirred up from the bottom by the bird's feet. The birds nest in the warm countries in large colonies, upon muddy flats near the water level. Their nests are big cones, cut off squarely at such a height that the mother bird can sit with her legs dangling down the sides, though she usually sits with them folded up beneath her. The flamingo of North America nests in the latitude of Florida. The male has a light red plumage, whose large feathers have black quills; the females are pale pink and the young nearly white. As is the case with other beautiful birds, their handsome plumes are causing so many of the birds to be killed by hunters that before long only a few will remain.

**Flamin'ian Way**, the principal northern road which led from ancient Rome. It was constructed by Caius Flaminius the elder, in 220 B. C., during his censorship, and led from Rome



FLAMINGO

to Ariminum on the Adriatic, 222 miles. Remains of it are yet extant in various places.

**Flammarion**, *fla'mah're ohN'*, CAMILLE (1842- ), a French astronomer and author, most of whose writings have been popular scientific works. He studied theology for a time, but at sixteen entered the imperial observatory,







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## FLAX

1—Field of flax in blossom. 2—Harvesting the flax for seed. 3—Pulling the flax for fiber. 4—Retting flax in a river. 5—Scene in a Belgian scutching mill. 6—Blackling the fiber. 7—A stalk in blossom; another in seed. 8—Flax Products.

where he remained for four years. As editor of a popular scientific magazine, *Cosmos*, his work first became prominent. Among his books are several astronomical romances and essays. Those of his publications which have been translated into English are *Marvels of the Heavens*, *The Atmosphere*, *Urania*, *Popular Astronomy*, *Lumen* and *The Unknown and Psychic Problems*. Flammarion conducted a series of balloon ascensions for the purpose of studying atmospheric phenomena.

**Flanders**, a region of Europe composed of the present provinces of East and West Flanders in Belgium, the southern part of Zealand and two departments of France. The erection of the territory into a county took place in the ninth century and was made by Philip the Bold, king of France, in favor of his son-in-law, Baldwin. It afterward passed to the united houses of Spain and Austria and ultimately to the latter, but was made smaller by the conquests of the French in the west, when part of it became French Flanders, and by the conquests of the Dutch in the north. The remainder still retains its ancient name and forms the modern provinces of East and West Flanders, in Belgium.

EAST FLANDERS has an area of 1158 square miles. Its soil, partly of a sandy and partly of a clayey nature, is so industriously and skillfully cultivated that it has the appearance of a vast garden. The principal crops are wheat and flax. Linen, laces and damask are among the important manufactures. Ghent is the capital. Population in 1910, 1,120,335.

WEST FLANDERS has an area of 1249 square miles. The most important industry is the manufacture of linens and laces. Bruges is the capital. Population in 1910, 874,135.

**Flan'nel**, a fabric made of wool, or of worsted, wool and silk, or of wool with cotton. It is used for outer and under garments, both in cold and hot climates, because it promotes an insensible perspiration, which is absorbed by the atmosphere. The best flannels are made in Wales.

**Flat'fish**, a fish which has a flat body, with both eyes on one side of its head, and swims on its side; for example, the flounder, turbot, halibut and sole. The term is also applied to other fishes with flat bodies, as the skate and other members of the ray family.

**Flat'head**, indian tribes on the Pacific coast. They flatten the skull of the infant by pressure. The same custom anciently prevailed among many tribes, but the practice is now nearly extinct. The name Flathead is improperly

given to the small, civilized tribe of Selish indians, who do not flatten the heads of their children.

**Flax**, a plant cultivated for its fiber and seed, both of which are of great economic value. The stalk grows from one and one-half to two feet in height, and contains considerable woody fiber and a pith. When the plants are not crowded, the stalk branches freely and bears a large number of bright blue blossoms, but when close together the stalks are long and slender, with only a few branches near the top. The flax has been known and cultivated for centuries, and from its fiber were made the costly fabrics used by the kings, queens and nobles of the oldest civilized nations. The processes in the manufacture of linen from flax fiber must always have been approximately what they are today, though of course far more crudely carried on.

The cultivation of flax demands more labor than that of almost any other crop, for every step from planting to the final preparation of the fiber must have the greatest care. If only the seed is to be used, the plants may be allowed to ripen, and may then be cut with a mower (see Figure 2 of the color plate); but if the fiber is to be saved the flax must be pulled by hand before it is quite ripe, for the best of the fiber is near the roots and is harmed by the cutting process (see Figure 3 of the color plate). The pulled flax is either tied together in bundles, and left upright on the field until it is dry, when the seeds are separated from it, or the separation is made immediately after the pulling, by means of an iron comb known as a *ripper*.

Next the flax is *retted*, or *rotted*, in water (Figure 4, color plate) until the fiber may be easily removed from the woody part of the stalk, and is then spread on the grass to dry. Each process, the retting and the drying, takes from ten days to two weeks. Freeing the fiber from the core requires two operations. First the *breaking* is done by means of a wooden handle and grooved board, or by revolving grooved rollers, and then the woody part is entirely separated from the fiber by a broad, flat wooden blade, called a *scutching blade*, or by a scutching machine (Figure 5, color plate) in which a number of knives attached to the arms of a vertical wheel strike the flax in the direction of its length. The flax is next *heckled*, or combed with an iron comb, the finer fibers being produced by repeated heckling, each time with a finer comb. See LINEN; SPINNING; WEAVING.



## Flea

The finest flax fibers are used for linens and laces, the coarser for cords and ropes and such heavy fabrics as are used for sails and bags. The seed is also a most valuable crop, and in certain countries, notably the United States, flax is raised entirely for the seed, which is used in the manufacture of linseed oil. The yearly flaxseed crop of the United States amounts to about 20,000,000 bushels, practically all of which is obtained from Minnesota and the Dakotas. Russia is the world's leading producer of flax, whether for fiber or for seed, though the fiber produced in Belgium is the best in the world.

**Flea**, *flee*, a wingless insect, usually classed with the fly, although regarded by many entomologists as a distinct order. The common flea is a little insect about one-eighth of an inch long, somewhat flattened in shape and covered with a shell composed of hard, overlapping plates. It has two thread-like antennae, and its mouth parts are adapted to piercing and sucking. The flea is remarkable for its great agility, being able to make remarkably long leaps. Different species prey upon different animals, and some show considerable intelligence and have been taught to do many remarkable things.



FLEA

**Fleabane**, *flee'bane*, a name popularly given to several plants, from their supposed power of destroying or driving away fleas. The *common fleabane*, whose smoke was supposed to expel fleas, is found in moist, sandy places in the south of England. The *blue fleabane* is common on dry banks. In the United States it is found abundantly in all parts east of the Mississippi River. It is also called *sweet scabious*, and other species closely allied to it are the *horseweed* and *butterweed*, or *colt's tail*. The seed is distributed by the winds and springs up in waste places and grain fields. The easiest way to eradicate this plant is to cultivate it late and to prevent its seeding.

**Fletch'er**, JOHN. See BEAUMONT AND FLETCHER.

**Fleur-de-lis**, *flor de lee'*, the French name for flower-of-the-lily, a genus of herbs of the iris family, growing in southern Europe. These flowers have large sword-shaped leaves and three-petaled flowers of various colors. The flower is famous as the emblem of the French kings. Many legends are related as to the origin of this emblem. It is generally con-

## Flint

ceded that the Frankish kings employed the fleur-de-lis as a kind of badge before the rise of heraldry.

**Fleury**, *flö re'*, ANDRÉ HERCULE DE (1653-1743), a French cardinal and prime minister of Louis XV. Louis XIV gave him the bishopric of Fréjus and appointed him instructor to Louis XV. After the death of the regent in 1723, Fleury proposed the duke of Bourbon as first minister, but in 1726 he overturned the government which he had himself set up, and from that date he kept the direction of affairs in his own hands. In the same year he was made a cardinal. His internal policy was wise and able and greatly benefited the country.

**Flicker**, a common name for the *golden-winged woodpecker*, one of the handsomest and commonest birds of the eastern United States. Its prevailing color is olive-brown, with black markings, while the rump and upper tail coverts, which it shows conspicuously in flight, are pure white. It has an ash-colored head and neck, the former barred by a strip of bright scarlet. The under parts are brown, fading toward the rear into yellow, and are marked with numerous round black spots. Across the breast and throat is a broad black crescent. In addition to all this, the under parts of the tail and wings are a rich golden yellow. It is seen throughout the whole Eastern United States, wintering as far north as southern Illinois. Its notes are difficult to describe, but are loud and so characteristic that having been once heard, they are easily recognized. Few birds have ever been given so many names, owing probably to its own prominence, for it does not seem at all afraid of man and goes readily about houses and buildings. Almost every locality has its own favorite name. *High-holder*, *sap-sucker*, *yellow-hammer*, *flicker* and *golden-winged woodpecker* are but a few of the names commonly known. In the Rocky Mountains and on the Pacific coast are different species varying somewhat in color and markings.

**Flint**, a variety of quartz, of a yellowish or bluish-gray or grayish-black color. It does not crystallize and usually occurs in nodules, or rounded lumps. Its surface is generally uneven and covered with a whitish rind or crust, the result of weathering or of the action of water percolating through the rocks. Flint is very hard, strikes fire with steel and is an ingredient in glass and in all fine pottery. Its true native place is the upper bed of the chalk formation.

## Flint

**Flint**, MICH., the county-seat of Genesee co., 68 mi. n. w. of Detroit, on the Flint River and on the Grand Trunk and the Pere Marquette railroads. The city has extensive lumber mills, grain elevators, breweries, brickyards, woolen mills and manufactories of flour, wagons, cigars, and other articles. It has a public library, Oak Grove Hospital and a state institution for the deaf and dumb. Flint was settled in 1820 and was chartered as a city in 1855. Population in 1910, 38,550.

**Flint'lock**, the name given to a gun which probably originated in Spain and was in use in one form or another from the early part of the seventeenth century to the early part of the nineteenth century. A piece of flint was fastened in the hammer, which, falling, struck a piece of steel. The sparks thus produced fell into a priming pan filled with powder, and thus exploded the charge.

**Flod'den Field**, a plain in Northumberland, famous for the battle fought there September 9, 1513, between James IV of Scotland and an English army led by the earl of Surrey. The armies were approximately equal in strength, and for a time the outcome of the battle was uncertain. The Scotch were, however, finally forced to retreat, with a loss of from eight thousand to ten thousand men. The English lost four thousand. Sir Walter Scott, in *Marmion*, gives a description of the battle.

**Flood**, a body of moving water which overflows land not usually covered with water. Flat lands on the sea coast and along the shores of rivers are, naturally, most exposed to danger of this sort, and history from the earliest times presents a long list of disasters from flood.

**SEA FLOODS.** These are far less frequent than river floods, but are likely to cause far more damage when they do occur. The most common cause of inundations by the sea is the bursting of dykes or sea walls in those countries which are actually below sea level at time of high tide. Parts of the Netherlands, for instance, are from sixteen to twenty feet below sea level, and only great dykes along much of the coast make the country a land area instead of a water area. In past times, when the construction of dykes was not as well understood as it is today, there were periodic floods which were terribly destructive. In 1421, about 100,000 people were drowned and 72 villages were under water. Just a century later another disastrous flood killed almost 100,000, and in 1570 about 20,000 perished in Friesland. Other

## Flood

causes of sea inundations are unusually high tides, or severe winds which drive the waves inland. The disaster at Galveston on September 8, 1900, in which 6,000 lives were lost and 3,000 buildings destroyed, was the result of a hurricane which piled up the waters on the coast. Earthquakes, too, occasionally give rise to sea floods, the best known example of such a disturbance being the tremendous tidal wave which followed the earthquake by which Lisbon was destroyed in 1755.

**RIVER FLOODS.** The United States has always suffered much from the overflow of rivers; indeed, one authority estimates that for years the annual devastation from floods of the Ohio alone has averaged \$50,000,000. River floods result from excessive rains, the sudden melting of ice and snow, or the bursting of reservoirs or banks. If such floods are regular, they may be quite the reverse of destructive; in Egypt, for instance, the agricultural life of the people has always depended on the overflow of the Nile (which see). The Mississippi River, too, is subject to floods, and almost a score of destructive inundations are recorded between 1828 and 1912. From Cairo to the mouth of the river levees have been built to hold the water within bounds, but an unusual rise in volume may either overtop these embankments or make breaks in them. The flood of March and April, 1912, was the most serious of which there is record. Over 15,000 square miles were flooded, many lives were lost, and property valued at \$45,000,000 was destroyed.

A year later, in the latter part of March, 1913, there occurred over much of Indiana and Ohio the heaviest rainfall ever recorded there, and as a result all the streams of that region passed their flood stages, and various towns were inundated. In Dayton, O., over 150 people lost their lives and millions of dollars worth of property was destroyed. Columbus, Zanesville, Chillicothe, Delaware, Hamilton, Piqua and Tiffin, in Ohio, and Peru and Brookville, Indiana, also suffered severely. These spring floods of 1913 surpass in point of property loss any other natural disaster in the history of the country.

As a means of preventing floods, various methods and devices are advocated, chief of which are the construction of reservoirs at stream sources, the extending and strengthening of levees and jetties, and the planting of trees on treeless areas. See **LEVEE**; **JETTY**; **FORESTS**, subhead *Value of Forests*; **MISSISSIPPI RIVER**.



## Flood Plain

**Flood Plain**, a plain formed by a river depositing sediment at its mouth or along its course. If formed in the upper or middle part of the river's course, the flood plain may be composed almost entirely of gravel and coarse sand, but the most extensive plains of this sort are formed in the lower part of the river's course and are composed of fine silt or alluvium. The flood plains in the lower course of the river or near its mouth are usually wider than those farther up stream. Since they follow the course of the stream, many of these plains are very irregular. In case of high water they may be flooded and covered with a new deposit of silt, or the current of the stream may become sufficiently strong to cut a new channel and cause serious damage. The flood plains along great rivers are usually densely populated, because of their fertility. The most noted of these plains are along the Nile, the Po, the Mississippi, the Rhine and the Ganges. See DELTA; RIVER.

**Flo'ra**, the Roman goddess of flowers and spring, whose worship was established at Rome in the earliest times. Her festival, the Floralia, was celebrated from April 28 to May 1.

The term *flora* as a common noun is used in botany to designate the total plant life of any region or period, as the flora of Massachusetts or the flora of the Carboniferous Age. The corresponding word for animal life is *fauna*.

**Florence**, *flor'ens*, a celebrated city of Italy, capital of a province of the same name, 143 mi. n. w. of Rome, and 50 mi. e. n. e. of Leghorn, on the river Arno. This stream is crossed by six bridges, the most important being the Ponte della Santa Trinita and the Ponte Vecchio. Most of the private dwellings are handsome, and the palaces, of which there are many, are noble and impressive structures. The city contains numerous piazzas or squares, the most important of which is the Piazza della Signoria. The most remarkable building in Florence is the Duomo, or Cathedral of Santa Maria del Fiore, which has the largest dome in the world. It has a magnificent campanile, which was begun by Giotto in 1334. The Church of Santa Croce, which is the burial place of many of the most eminent Tuscans, contains much fine sculpture and many interesting tombs, among others those of Michelangelo, Galileo, Machiavelli and Alfieri. The charitable institutions are numerous and important. Schools and other literary and educational establishments are also numerous. The manufactures have greatly declined in importance, but still embrace woolens, silk,

## Florence

straw hats, porcelain, mosaics and numerous objects in the fine arts.

Florence was probably founded by the Romans in the first century B. C. and early attained considerable prosperity. In 1215 the city became the center of a bitter strife between the two factions known as Guelphs and Ghibellines (See GUELPHS AND GHIBELLINES). In 1283 a species of republic was constituted; but about the year 1300 party struggles again burst forth between rival families under the new names of the *Whites* and the *Blacks*, in which the Blacks were eventually victorious, and the Whites, among whom was the poet Dante, were banished. Towards the close of the fourteenth century, the wealthy Abizzi became chief rulers of Florence, but they were overthrown in 1434 by the Medici, who then ruled supreme. Under their rule the city rose to great splendor (See MEDICI). The ducal dynasty of Medici continued to rule till the year 1737, when, becoming extinct, they were succeeded by Francis of Lorraine, afterward emperor of Germany. From this period the history of Florence merges into that of Tuscany, until its amalgamation with the kingdom of Italy. From 1865 till 1871 it held the dignity of capital of the kingdom, the seat of government being transferred to it from Turin. Among the illustrious men it has produced are Dante, Petrarch, Boccaccio, Guicciardini, Lorenzo de' Medici, Galileo, Michelangelo, Leonardo da Vinci, Benvenuto Cellini, Andrea del Sarto, Amerigo Vespucci, Machiavelli and others. Population in 1911, 232,860.

**Florence, ALA.**, the county-seat of Lauderdale co., 127 mi. s. w. of Nashville, Tenn., on the Tennessee River and on the Louisville & Nashville and the Southern railroads. The manufactures include wagons, wooden pumps, boilers, engines, stoves, fertilizers, cottonseed oil, pig iron, cotton yarns and cloth. There are extensive lumbering and mining industries in the vicinity. Florence ships most of the cotton of the adjacent country. It is the seat of the state normal college. A steel railroad and passenger bridge here crosses the Tennessee. Population in 1910, 6689.

**Florence, S. C.**, the county-seat of Florence co., is situated 82 mi. e. by n. of Columbia, on the Atlantic Coast Line Railroad. It is in the midst of a fertile agricultural region and has a large trade in tobacco and cotton. The important industrial establishments include tobacco warehouses, stemmeries and drying houses, cottonseed oil mills, lumber mills, railroad shops and

machine shops. The city has a fine United States Government building and owns and operates its waterworks. Population in 1910, 7057.

**Florentine School of Painting.** See PAINTING.

**Flor'ida**, the EVERGLADE STATE (also called the PENINSULA STATE), one of the Southern states, forming the southeastern extremity of the country, bounded on the n. by Alabama and Georgia; on the e. by the Atlantic Ocean; on the s. and w. by the Gulf of Mexico, and on the w. by Alabama. It consists of a peninsula about 400 miles long and 90 miles wide, and a narrow belt 350 miles in length from west to east, extending from the Perdido River to the Atlantic coast. The total area is 58,666 square miles, of which 3805 are water surface. Population in 1910, 752,615.

**SURFACE AND DRAINAGE.** The northwestern part of the state is hilly and rolling, being an extension of the Alabama uplands. This region descends to a low flat coast. The eastern part of the state is low and nearly level, but the surface rises from each coast towards the interior, where in some places it reaches an altitude of from 100 to 300 feet. This rise forms the divide which separates the rivers flowing into the Atlantic from those flowing into the Gulf. The lands along the coast are low, level and often marshy. They have been formed by gradual elevation from the ocean and by the action of the coral polyp (See CORAL). The coral formation is still going on, as seen along the coast and in the growth of the Florida Keys, which appear to be an extension of the mainland. These islands extend southwest along the coast for 200 miles; they rise but a few feet above the water, but contain fertile farms, and in others are found good harbors. South of Lake Okeechobee the Big Cypress Swamp and the everglades extend over a large part of the peninsula. These swamps will eventually be drained and transformed into fertile farms (See EVERGLADES). Florida has a coast line of nearly 1200 miles in extent. Of this 675 miles are on the Gulf and the remainder on the Atlantic. The western coast contains several deep indentations in which good harbors are found, but the eastern is much more regular.

The principal rivers are the Saint Mary's, forming a part of the boundary between Florida and Georgia; the Saint John's, flowing into the Atlantic; the Caloosahatchee, draining Lake Okeechobee into the Gulf; the Peace, flowing into Charlotte Harbor; the Suwanee, crossing the state from the north, and the Appalachicola, which is an extension of the Chattahoochee and

Flint rivers of Georgia. The state contains over 1200 lakes, the largest of which is Okeechobee, which has an area of 650 square miles. This is situated on the northern border of the Everglades (See EVERGLADES).

**CLIMATE.** Florida, except in the swamp region, possesses one of the most equable and healthful climates in the United States. The climate is free from extremes, the winter temperature seldom falling below 32° and the summer temperature rarely exceeding 90°. The average annual winter temperature is 60°, the average summer temperature, 78°. There is little spring or autumn and such a brief winter that summer is said to last two-thirds of the year. June, July and August constitute the rainy season. There are, on an average, 250 clear days in the year. Droughts and frosts are rare. Jacksonville, Saint Augustine, Miami, Key West and Tampa are popular winter resorts, especially for persons afflicted with throat or lung diseases. The rainfall is heavy, being 55 inches at Jacksonville and over 60 inches in some places on the gulf coast.

**MINERAL RESOURCES.** The minerals are comparatively few. The most important mineral is phosphate rock, which is found in almost every county of the state and in some sections is mined in large quantities and exported to European countries for fertilizer. Kaolin, peat, lime and limestone are found in limited quantities, and in a few localities, agate, carnelian and chalcedony are found of sufficient quality to make them valuable as precious stones. Fuller's earth is an important product.

**AGRICULTURE.** Agriculture is the leading industry of Florida. For agricultural purposes the state may be considered in three divisions, Northern, Middle and Southern Florida. Northern Florida includes that part of the state extending south as far as Saint Augustine. It produces cereals, arrowroot, rice, potatoes, tobacco, apples, figs, peaches, pears and sea-island cotton. Middle Florida extends from the latitude of Saint Augustine to Tampa Bay. This region yields cotton, sugar cane, sweet potatoes, tobacco, rice, oranges, lemons, grapes, guavas, garden vegetables and small fruits. In Southern Florida are produced bananas, sugar cane, pineapples, olives and cocoanuts. Fruits from China and Japan have been successfully introduced. The ginger, clove, pepper and pimento are valuable products. The cultivation and export of oranges is an important industry. Cotton, rice, sugar and tobacco are also valuable products. Stock-



## Florida

raising is an important branch of agriculture. Grasses grow in abundance, and flowers bloom in luxuriance almost all the year round. The most valuable resource of Florida is its forests, estimated to cover 25,000,000 acres and composed largely of pitch pine and different species of evergreen oaks.

**OTHER INDUSTRIES.** The principal manufactures are lumber and forest products, tar, turpentine and resin. Large areas are covered with groves of long-leaved pine, and the lumber from this is exported to other states and to foreign countries. Pensacola and Jacksonville are the chief cities of lumber export. Exceeding lumber in importance is the manufacture of cigars, which industry has its chief center at Tampa. This industry is of comparatively recent growth and was introduced into the state by immigrants from Cuba. The manufacturer uses the tobacco raised in Florida and some transported from Cuba.

The coasts and streams contain an abundance of food fish and shellfish, and the taking of shad, mullet and other fish is an important industry. Oyster culture has also been established in some localities, and there are extensive sponge fisheries in and about the islands. In all, the fisheries furnish employment to over 9000 men, and the value of their annual product is \$3,400,000.

**TRANSPORTATION AND COMMERCE.** The extensive coast line affords good harbors, especially on the gulf coast. The Saint John's, Saint Mary's, Suwanee and Appalachicola rivers are all navigable for large boats, and a number of other streams are navigable for smaller ones. The railways have been rapidly extended through the state in the last few years, and trunk lines now connect all of the important cities with one another and with the principal commercial centers farther north. The railway mileage of the state is about 3500 miles in extent.

The commerce consists in the export of fruits, manufactured tobacco, fish and phosphate rock, while the imports of the state are largely of manufactured products and of foodstuffs not profitably grown there.

**GOVERNMENT.** The legislature consists of a senate and an assembly, the former composed of 32 members, chosen for four years, and the latter of 68 members, chosen for two years. The legislative sessions are held every other year and are limited to sixty days. The governor is elected for four years and is not eligible to succeed himself. The other state officers, elected for an equal term, are the attorney-general, the

## Florida

secretary of state, the comptroller, the commissioner of agriculture, the treasurer and the superintendent of public instruction. The courts consist of a supreme court, comprising a chief justice and five associates, chosen every other year by twos, for a term of six years; also circuit, criminal and county courts and those of justices of the peace. The main units of local government are the counties and incorporated municipalities. The counties elect five commissioners and a sheriff, who, with the other county officers, serve for a term of two years.

**EDUCATION.** The schools have the benefit of a fund derived from the sixteenth section of land in every township, also of a fund obtained from a one-mill tax assessed upon all taxable property. These funds are supplemented by local taxation. In the larger towns graded schools are established, and throughout the state there are separate schools for white and colored children. Florida, like all other states that suffered in the Civil War, has met with many difficulties in developing its educational system, but notwithstanding this, continuous progress is being made, and within the last few years a marked advance is noticeable. The higher institutions of learning are the University of Florida at Gainesville and the Florida State College for Women at Tallahassee. Numerous colleges and secondary schools are maintained by various church denominations.

The state institution for the blind and dumb is located at Saint Augustine and the state reformatory is at Marianna. There is a hospital for the insane at Chattahoochee, also a home for the Confederate soldiers and sailors. The state convicts are maintained in camps, instead of in a central penal institution, and are managed under the contract system, by which they are employed in squads under the supervision of state officers, but in the interests of private individuals or corporations, to whom the convicts are leased.

**CITIES.** The important cities are Tallahassee, the capital, Jacksonville, Saint Augustine, Tampa, Key West, Pensacola and Gainesville, each of which is described under its title.

**HISTORY.** Florida was discovered on Easter Sunday (Spanish, *Pascua Florida*, hence its name) in 1512, by Ponce de Leon, a Spanish adventurer in search of the fountain of perpetual youth. Narvaez and De Soto both traversed the country. Huguenot refugees twice attempted settlement on the Saint John's River; the second time the colonists were massacred by Spaniards under Menendez, who founded Saint Augustine.

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In 1699 the Spaniards founded Pensacola. East and West Florida (separated by the Appalachicola River) came under the control of the English by the treaty of 1763; were ceded to Spain in 1783 and transferred to the United States in 1819, after a long controversy, due to the fact that Florida was a haven for pirates and thieves and a refuge for fleeing slaves, while Spain took no steps to preserve order. Florida was admitted to the Union in 1845. From 1835 to 1842 war was waged with the Seminoles, and as a result they were given lands west of the Mississippi. In 1861 the state seceded from the Union and seized Fort Marion, the arsenal at Saint Augustine, the arsenal at Chattahoochee and the navy yards and forts at Pensacola. In 1862 Jacksonville, Fernandina and Saint Augustine were captured by the Federal forces. In 1865 the ordinance of secession was repealed, and in 1868 a new constitution was framed, the Fourteenth Amendment was ratified and the state was readmitted to the Union. From this time on the chief points of interest in Florida history concerned the bitter political contests for control of the state and the settlement of financial difficulties by the government. The state played an important part in the election controversy of 1876 and has since been generally Democratic.

**Florida**, **GULF OF**, the narrow sea between Florida, Cuba and the Bahama Islands. The length is over 300 miles, and the width is from 60 to 100 miles.

**Florida Keys** or **Florida Reefs**, a chain of islands, sand banks and reefs, which begin at Cape Florida and continue southwest for about 220 miles. There are a great many of these islands and most of them are of coral formation. One of the largest is Key West, or Bone Key, on which is built the city of Key West. For illustration of Florida East Coast Railway, see **KEY WEST**.

**Flor'in**, a name given to several coins of gold or silver, of different values, and to corresponding moneys of account. The English florin is equal to 2 shillings, or about 50 cents. Until recently the florin, or *gulden*, worth about 40 cents, was the monetary unit of Austria, and a coin of the same name and value, also called *guilder*, is still the unit in the Netherlands. The name was first given to a famous coin made in Florence about 1252.

**Flotow**, *flo'to*, **FRIEDRICH VON** (1812-1883), a German musical composer. His musical education was brief, terminating in 1830, when he

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began to devote himself to composition. His *Le Naufrage de la Meduse* was successfully produced at the Renaissance Theater in 1839. This was followed by *L'Esclave de Camoens* and *Le Forestier*. *Alessandro Stradella* was performed at Hamburg in 1844, and his greatest work, *Martha*, was given at Vienna in 1847.

**Flot'sam, Jet'sam and Li'gan**. In English law, *flotsam*, or *floatsam*, is shipwrecked goods floating on the sea; *jetsam*, goods thrown overboard, which sink and remain under water; and *ligan*, goods sunk with a wreck or attached to a buoy, so that they may be recovered. Such goods go to the Crown.

**Floun'der**, one of the most common of the flat sea fishes, found along the shores of almost all countries. The body, which is extremely flattened at the sides, has the upper side dark



FLOUNDER

and spotted and the under side white. Both eyes are on the upper side, and one is set lower than the other, giving the face a twisted appearance. The flounder is esteemed for its flesh.

**Flour**, *flowr*, the edible part of wheat or any other grain, reduced to powder and separated from the bran and the other coarser parts by lifting. The flour of oats and corn is usually called *meal*, and that from other grains takes its name from the grain, as rye flour and barley flour, while the term *flour*, without any qualification, means *wheat flour*.

The process of manufacturing flour in modern flour mills is as follows: The wheat is run from the cars into tin carrying-cups on an elevator belt, which lift it to the top of the building and dump it into bins. When needed it is let out, by means of spouts, into the machines which prepare it for grinding. It is forced first in a slow, steady stream into the mouth of a device known as the wheat separator and oat extractor. As it falls downward a blast of air strikes it, and the chaff and light dirt are blown away. The wheat falls upon a sieve, set at an incline, and passes through the meshes. Grains of corn, oats and pieces of straw are thus separated from the wheat. After passing through three such sieves, the wheat strikes a fourth, in which the perforations are so small that only the bits of clay and



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small seeds go through, and the wheat itself is carried over into a spout, which carries it along to the cockle separator. Cockle is a rough, black seed which, if ground in with the flour, makes it dark and unwholesome. The device for removing this from the wheat consists of a round cylinder, the inside of which is full of small indentations, large enough to catch and carry a cockle seed, but too small for a grain of wheat. When the wheat is inside, therefore, and the cylinder revolves, the cockle is carried up in the indentations, and falls out upon the catch board. The cylinder being set at an angle, the wheat slides out by itself.

The next machine is a cylinder, in which a wire brush revolves very rapidly. As the wheat goes through, the fuzz at the end of the kernel and every particle of dirt from the crease is wiped out and sucked away into an air shaft. From this machine the wheat passes in a steady stream over some powerful magnets, so that any bits of iron wire, nails or screws which may have fallen into the grain from the harvesters or threshers, will be drawn out.

The wheat is now clean and ready to be crushed. The grinding is done by steel or porcelain rollers, and every complete mill has five sets of these rolls. In the first the spiral corrugations on the rolls are comparatively coarse, so that the wheat will simply be broken open longitudinally. The other sets grow progressively finer and are set much closer together. From the rolls the crushed wheat goes up to be *scalped*. The machines used in most mills for this purpose are centrifugal reels, covered with wire cloth and silk gauze, the meshes of which vary in size. The crushed wheat is thrown at the sieves by centrifugal force, and many impurities are removed. One of these machines consists of a long flat box, full of sieves, set at an incline and perforated with graduated meshes. The whole device is given an eccentric motion by being fastened a few inches at one side of the center to a great wheel. By this means of jolting, the crushed wheat is rattled through the sieves and graded according to the size of mesh through which it passes.

The *middlings*, as the crushed wheat is called, is now carried on to the middlings purifier, the invention of which a few years ago revolutionized the whole art of milling. Its work is to remove the impurities and the bran from the flour. It accomplishes this purpose by subjecting the passing stream of middlings to air blasts of varying force. The light dust and bran are

## Flowers

carried upward and caught in little pockets, and the purified middlings pass back to the second set of rollers, where they are crushed again. This circuit of processes, the rollers, the plansifter and the middlings purifier, is repeated five different times, and the separation and grinding is then complete. The flour from the last process is carried downstairs, where it is cooled by a blast of cold air and run into sacks. The bran, after passing through a machine which brushes off the remaining particles of flour, goes through a chute of its own and is bagged.

One of the most important machines in a mill is the dust collector. Before it was invented the air of mills was always full of flying particles of flour, which sometimes exploded with all the force of gunpowder. The dust collector is a fan, which, in creating a vacuum, sucks the flour out of the air and deposits it in a chamber by itself. See WHEAT.

**Flow'er**, ROSWELL PETTIBONE (1835-1899), an American capitalist and politician, born in Jefferson County, N. Y. He removed to New York City in 1869 and soon attained an influential place in Wall Street. He was elected Democratic representative to Congress in 1881 and was governor of New York from 1892 to 1894.

**Flowers**, modified branches, or shoots, designed for the production of seeds. In a typical flower there are four circles or parts: The first, or outermost, is the *calyx*, which is often leaf-like and in the form of a cup, but divided into separate parts, known as *sepals*. The function of the calyx is the protection of the more delicate parts within. The next circle within is the *corolla*, whose parts are called *petals*. The corolla is usually bright-colored, and its design seems to be to attract insects or birds and, also, to protect still further the *stamens* and *pistils*, that form the third and fourth circles. Each of the stamens is composed of two parts, a stem, called the *filament*, and a sack at the top, called the *anther*. The innermost organs are called pistils and consist of, first, an enlarged chamber, called the *ovary*, containing *ovules*; a stem, called the *style*, and a tube, called the *stigma*. Within the stamens is ripened the *pollen*, which must be carried to the pistils, in order to fertilize the ovules, which thereafter become seeds. Few flowers are altogether typical. Often, not all of the four circles are present. Either the calyx or the corolla or both may be lacking, or only stamens may be found in one flower, while the pistils are in another flower on the same plant. The flowers on one plant may all contain stamens

## WONDER QUESTIONS ON FLOWERING PLANTS

### Why do plants bear flowers?

All of the earth's flowering plants, and they constitute by far the majority of plants, produce flowers for the purpose of reproducing other plants. According to the botanist, the purpose of flowers is to bear seeds, and of seeds to make new plants. When we remember, however, the happiness that flowers bring to human kind, and how much they contribute to the world's beauty, we are inclined to believe that they were created also to increase our joy in life.

### Is there a special reason for the bright colors, peculiar forms and pronounced odor of flowers?

This question opens up one of the most interesting fields in flower study. We must bear in mind that flowering plants multiply through the transference of pollen from one flower to another, and that birds and insects play a very important part in this work. They visit the flowers for pollen and nectar, and as they fly from blossom to blossom they carry with them the fertilizing grains. It is interesting to know that conspicuous colors and odors serve as a lure for these industrious pollen carriers, and that many curious shapes and markings are for the same purpose. Some flowers, like the roses and buttercups, attract all sorts of insect visitors; others are so shaped that only certain kinds can reach their pollen or nectar. The honeysuckle and trumpet flower allure the humming birds, and the violets are visited by bees, but not by smaller insects. A careful study of flowering plants shows the wonderful way in which nature has adapted the flowers to the needs of insects and birds, so that they, in turn, may help the plants carry on their life processes.

### Do plants have the power of movement?

Of course we would never expect to see the rosebush in our garden get up and walk away like the dog lying beside it, but many plants have power to move in other ways. That is, they can move such parts as the flowers and leaves. The blossoms of the morning glory, for instance, close after the sun gets bright in the sky, and do not open until the next morning. The stamens of the barberry flower spring up when touched, and the leaflets of the sensitive plant fold over each other when the plant is shaken. The compound leaves of many plants have the power of changing the position of their leaflets according to changes of light and temperature. For example, the leaflets will be edgewise toward the sun during the hottest hours of the day, and be expanded horizontally when the sun is low. Some leaves droop, or go to sleep at night, such as those of the wood sorrel and acacia. So we see that various parts of a plant may change position, even though the plant itself is stationary. The familiar statement that an animal differs from a plant in its power of movement should be amended. It is more correct

to say that most animals are more active than most plants.

### Do flowers eat?

The life of a flower depends upon the nourishment the whole plant receives. We know that plants receive food from the soil, absorbing it through their roots; yet there are some interesting plants that capture insects and other small animals and digest them. If you are familiar with the sundew you will remember that at the base of the flower stalk there is a circle of roundish leaves bearing bristles. Each of these bristles ends in a knob covered with a sticky liquid. When a small insect lights on one of these knobs and cannot get away, the bristles begin to close over it, and it is soon a prisoner. Then the leaf pours out a juice that digests the soft parts of the insect, and the plant reabsorbs the liquid. This is the way one plant helps feed its flower. Then there is the interesting pitcher plant, whose leaves resemble a hooded pitcher. Most of the time the leaves are partly full of water, in which insects crawl and drown. The leaves of the Venus's flytrap, another curious plant, are in truth a trap for unwary insects, for they end in a hinged portion that opens and closes quickly upon unlucky visitors. Plants of this character, which feed on animal food, are called carnivorous plants.

### Do flowers have souls?

The lover of flowers likes to think so, and much of the poetry about flowers suggests that they have souls. Someone has said, "The odors of flowers are their souls." But though plants respond so wonderfully to the care lavished upon them, they never talk to us in the sense that animals do, and the idea that they have souls is purely one of sentiment. The absence in plants of the thing we call mind or soul is an important point of distinction between the plant and the animal world. The higher animals possess an intricate nervous system with a brain center, but the most elaborate of cultivated plants has nothing to correspond to a brain. Flowers therefore can be plucked without feeling pain, and they know nothing of fear, joy, sorrow or disappointment. It is the imaginative and sentimental in mankind that endows them with intelligence.

### What gives the flowers their different colors?

Within the tiny seed, the nucleus of the plant, are produced certain ferments that determine the colors of the flowers. Just how this is accomplished no man can explain, any more than he can explain how the seed expands into a plant. We know, however, that leaves are green because they contain a green coloring matter called chlorophyll. The purpose of this substance is to help the plant manufacture starch. It is an interesting fact that no flowers are green. Some botanists explain this by saying that if the stem, leaves and flowers were all green



insects would find it difficult to distinguish the flowers, which they visit to procure pollen and nectar.

### Were the flowers all wild at one time?

Yes, all of our cultivated flowers are descendants of wild flowers. Many of the varieties that are now fairly common did not at one time exist, and the art of floriculture is constantly expanding. By scientific methods of breeding, men are able to produce new forms of practically all flowers.

### Do all trees bear flowers?

Yes, trees are important members of the great class of plants that produce flowers and seeds. Not all trees, however, bear flowers of size and prominence. In fact, the beauty of a great many trees depends chiefly upon their foliage, and most people never see their flowers. This is because the blooms of such trees have no petals, the most noticeable parts of the typical flower. But many fruit trees, such as the apple and cherry, have blossoms everywhere known for their loveliness and fragrance. This reminds us that flowers are produced in a wide variety of forms. A typical, or perfect, flower has four circles or sections—calyx, corolla, stamens and pistils—but very few flowers have all of these parts.

### In what ways do flowering plants help mankind?

These plants help us in a great many ways. First of all, they make breathing easier for us. They use up a great deal of carbon dioxide, which we breathe out as waste matter, and they send into the air oxygen, without which no one can live. Plants add to our comfort by providing shade in the summer, and they also prevent water which falls as rain or dew from too rapid evaporation. Forests help to regulate rainfall and to conserve moisture. From flowering plants we get the greater portion of the food that sustains life. Fruits, vegetables and cereals are all products of flowering plants. Our favorite beverages, tea, coffee, cocoa and chocolate, are derived from plants. All of the spices that we use to flavor our foods come from plant sources. Moreover, our clothing is partly of plant origin, for linen and cotton are fabrics woven of plant fibers. Then there are the trees, which provide mankind with wood for houses, ships and furniture. In fact, man could not exist without the wonderful plant kingdom.

### Do all flowering plants of a certain kind belong to the same family?

There is always some definite connection between the plants of one family, but many curious relationships may occur. For example, the lovely Easter lily, the lily of the valley, the tulip, the hyacinth and the trillium belong to one family (the lily), but this same family contains also the ill-smelling onion and the unromantic asparagus. The rose family contains not only the loveliest flowers ever grown, but also the most delicious fruit plants—the apple, peach, pear, strawberry and others. But the cranberry and huckleberry belong to the heath family. Perhaps the strangest family is the nightshade, to which belong many useful plants, as the potato and tomato,

and also many poisonous ones and a number of annoying weeds. Botanists group different plants together according to similarities of structure, not according to their degree of attractiveness.

### Why is the dandelion considered a weed and the rose a welcome flower?

The term "weed" is applied to any flower when it multiplies so rapidly that it makes a nuisance of itself. Most people think a lawn is spoiled if the hardy dandelion gets a hold in it, and that cheery little flower is anything but welcome. Dandelions need no encouragement. All they ask is to be let alone and they will grow abundantly. But the rose, the queen of the garden, needs the tenderest care and much coaxing. No one can imagine a mass of American beauties, for instance, running riot over a lawn. A number of the attractive flowering plants that give color and charm to the country landscape are nothing but weeds to the farmer. It is a question of the right thing in the right place with the agriculturist. Flowers that become weeds are of the hardy, persistent sort, which spread rapidly and easily adjust themselves to conditions.

### How do plants protect themselves from excessive dryness?

Plants give off surplus water through their leaves. Those which grow in arid regions where all possible moisture must be conserved have leaves so shaped that they cannot give off water. Frequently, as in case of some species of cactus, the leaves are entirely lacking, and their work is done by the green outer layers of the stem. It sometimes happens that a corn plant suffers from too much dryness in very hot weather. At such times the leaves roll up and the evaporating surfaces are kept on the inside of the rolls. Moisture is thus conserved until there is rain, when the leaves unroll. Pines, spruces, cedars and other evergreen trees have long, narrow leaves that cannot give off much moisture, and these plants are therefore kept from drying up in the winter, when their roots can absorb but little moisture from the frozen earth.

### Do plants, like animals, have a struggle for existence?

Plants, like animals, are engaged in bitter competition for life. The stronger plants crowd the weaker ones, and cripple or kill them outright. Plants are injured in this crowding process by being deprived of sufficient light, water and plant food. Suppose a thousand weed seedlings should spring up in one square foot of ground. In the struggle which followed there would survive, out of the thousand, only one or two plants. Seeds have to be produced in countless numbers to keep plant life distributed, for only a small per cent of those produced have an opportunity to germinate. Scientists tell us that about 5,300,000 acres of land could be sown with the wheat grown at the end of fifteen years from a single kernel if every grain were productive. There are agencies for distributing seeds and other agencies for destroying them, and just about the right balance is maintained to keep obnoxious plants from over-multiplying and useful ones from becoming extinct.







## NATIONAL FLOWERS

1 and 2, Roses: England and Persia.  
 3, Shamrock: Ireland.  
 4 and 5, Lilies: Italy.  
 6, Edelweiss: Switzerland.

7, Fleur-de-lis: France.  
 8, Cactus: Mexico.  
 9, Chrysanthemum: Japan.  
 10, Thistle: Scotland.  
 11, Sugar Maple: Canada.

12, Golden-Rod: United States.  
 13, Lotus: Egypt and India.  
 14, Pomegranate: Spain.  
 15, Kaiser-Blume: Germany.





## STATE FLOWERS

1, Orange Blossom: Florida.  
2, Magnolia: Louisiana, Mississippi.  
3, Mountain Laurel: Connecticut.

4, Rhododendron: Washington, West Virginia.  
5, Anemone: South Dakota.

6, Violet: Illinois, New Jersey, Rhode Island, Wisconsin.  
7, Daisy: Tennessee.  
8, Carnation: Indiana, Ohio.





## Flowers

only, while those of another plant contain pistils only. Then, the parts of each circle may be variously united in one solid ring or cup, or so grown together that it is impossible to distinguish one circle from the other. However numerous or remarkable these variations, it is almost always possible to distinguish some trace of the typical flower; that is, if there are five divisions in any one of the circles, traces will be found of a similar division in the other circles. The typical flowers are comparatively uninteresting, if one considers the wonderfully irregular blossoms of many plants. The meaning of these strange shapes has not yet been fully determined, but botanists who have made a painstaking study of the varied forms think that all have some definite reference to the way in which the pollen is carried from stamens to pistils. (See ORCHID). The one great fact in the life of the flower is that the pollen must be transported to the stamen, and it has been proved again and again that those plants grow strongest and best which are from seeds fertilized by pollen from a different flower on the same plant or from an entirely different plant. If one considers that the brilliancy of color, the varied and wonderful shapes, the honey-bearing sacks, the peculiar markings are all methods of attracting insects or birds, the astonishing irregularity becomes even more attractive than at first it seemed. In the accompanying plate are to be seen some of the most remarkable forms of flowers.

**Flowers, ARTIFICIAL**, imitations of flowers, which may be made of various materials. Such flowers were known centuries before the beginning of the Christian era; flowers made of papyrus bark and silk were common in Greece, and in both Greece and Rome there were in use wreaths of flowers made of gold and silver. During the Middle Ages artificial flowers were made in great numbers, especially in Spain and Italy, and were used for religious purposes. Among modern cities Paris takes the lead in the making of artificial flowers. The most common materials used in this industry are silks, linen, cotton, gauze, satin, velvet, wax, paper and glass. The stems are made of wire, wrapped with tissue paper or silk or covered with green rubber tubing.

Artificial flowers are used in the United States and England chiefly as trimming for ladies' headwear, but in Europe they are still in use for garlands and in house decorations. Another important use to which they are put is the illustration in botanical laboratories of the flora of the world.

## Flowers

Of course the manufacture of flowers which are to be used for this purpose is a much more delicate task than that of flowers which are used merely for ornament, and the maker must have considerable botanical knowledge. There is at Harvard University a collection of flowers made of glass, which illustrate the flora of the United States.

**Flowers, LANGUAGE OF**, a device originating long ago in the Orient, by which one may partially express his thoughts and feelings by means of flowers. It grew out of the custom prevalent in medieval times, by which lovers conveyed their tender messages through beautiful flowers. To some extent the custom still survives, though in the practical New World it is of little interest. Strangely enough, the language is almost universal, varying in different countries only in regard to certain flowers which are locally significant. Still, as in the olden times, the lily denotes innocence; the forget-me-not, friendship; the red rose, I love you, and the white rose, I will wed you. The following are flowers whose significance is well established:

Amaranth.....	Immortality
Anemone.....	Anticipation
Apple Blossom.....	Admiration
Aspen Leaf.....	Fear
Brier.....	Insult
Buttercup.....	Wealth
Camellia.....	Illness
Calla.....	Pride
Candytuft.....	Indifference
Cornflower.....	Heaven
Cowslip.....	Youthful beauty
Cypress.....	Death
Daffodil.....	Unrequited love
Daisy.....	Simplicity
Dandelion.....	Coquetry
Evergreen.....	Hope
Everlastings.....	Undying affection
Fern.....	Forsaken
Five-leafed Clover.....	Bad luck
Four-leafed Clover.....	Good luck
Foxglove.....	Insincerity
Goldenrod.....	Encouragement
Heather.....	Loneliness
Heliotrope.....	Devotion
Hepatica.....	Anger
Honeysuckle.....	Fidelity
Hyacinth.....	Sorrow
Ivy.....	Trustfulness
Laurel.....	Fame
Lilac.....	Fastidiousness
Lotus.....	Forgetfulness
Marigold.....	Contempt
Moss or a dry twig.....	Old age
Myrtle.....	Wedded bliss
Narcissus.....	Vanity
Oak Leaf.....	Power
Orange Blossom.....	Marriage
Oxalis.....	Pangs of regret



## Flowers

Palm Leaf.....	Conquest
Pansy.....	Loving thoughts
Poppy.....	A tryst at evening
Rosemary.....	Remembrance
Rue.....	Repentance
Scarlet Geranium.....	A kiss
Snowdrop.....	A friend in need
Sting Nettle.....	Rudeness
Tuberose.....	Bereavement
Tulip.....	Boldness
Violet.....	Modesty
Yellow Rose.....	Jealousy

**Flowers, NATIONAL AND STATE.** In some countries a flower has been legally adopted as national emblem, but in a majority of cases it has by its association with the poetry, religious ceremonies or popular sentiment of the people gradually become universally recognized as the nation's symbol. One of the oldest of national flowers is the lotus of Egypt, sacred to the god Osiris and, in all hieroglyphics, signifying Southern Egypt. The lotus is also the national flower of India, and the natives believe that in its bosom Brahma was born. For Persia the emblem is the rose; for Japan, the chrysanthemum. The national flower of modern Greece is the blue violet; of modern Italy, the white lily; of France, the *fleur-de-lis*, or iris; of Germany, the *Kaiser-blume*, or corn flower; of Switzerland, the rare edelweiss. On the national coat of arms of Great Britain, just below the shield, are engraved the English rose, the Scotch thistle and the Irish shamrock. Spain's emblem is the scarlet pomegranate; Mexico's, the prickly pear.

In the United States, in 1899, by a popular vote, the goldenrod was selected as the national flower. A number of states have adopted, usually by vote of the public school children, certain local flowers as their emblems. The following is a list of these states:

Alabama.....	Sunflower
Alaska.....	Forget-Me-Not
Arizona.....	Sequoia Cactus
Arkansas.....	Apple Blossom
California.....	Poppy
Colorado.....	Columbine
Connecticut.....	Mountain Laurel
Delaware.....	Peach Blossom
District of Columbia.....	Nasturtium
Florida.....	Orange Blossom
Georgia.....	Cherokee Rose
Idaho.....	Syringa
Illinois.....	Violet
Indiana.....	Carnation
Iowa.....	Wild Rose
Kansas.....	Sunflower
Kentucky.....	Goldenrod
Louisiana.....	Magnolia
Maine.....	Pine Cone and Tassel
Maryland.....	Black Eyed Susan
Michigan.....	Apple Blossom

## Fluorescence

Minnesota.....	Moccasin
Mississippi.....	Magnolia
Missouri.....	Goldenrod
Montana.....	Bitterroot
Nebraska.....	Goldenrod
Nevada.....	Sagebrush Shrub
New Jersey.....	Violet
New Mexico.....	Cactus
New York.....	Rose
North Dakota.....	Wild Rose
Ohio.....	Carnation
Oklahoma.....	Mistletoe
Oregon.....	Oregon Grape
Rhode Island.....	Violet
South Dakota.....	Anemone
Tennessee.....	Daisy
Texas.....	Bluebonnet
Utah.....	Sego Lily
Vermont.....	Red Clover
Washington.....	Rhododendron
West Virginia.....	Rhododendron
Wisconsin.....	Violet
Wyoming.....	Gentian

**Floyd, JOHN BUCHANAN** (1807-1863), an American statesman and soldier, born at Blacksburg, Va., educated at the College of South Carolina. He was admitted to the bar and practiced his profession at Helena, Ark., but returned to Virginia in 1839. He later served in the legislature and was governor of the state. In 1857 he was appointed secretary of war and constantly administered favors to the party then demanding the secession of the Southern states, until December, 1860, when he retired from the cabinet at the request of the President. He was a brigadier-general in the Confederate army and was senior in command at Fort Donelson before its surrender. See FORT HENRY AND FORT DONELSON.

**Fluorescence, flu o res' sens.** When a ray of white light passes through a prism, the solar spectrum is seen showing violet at one end. There are, however, other invisible rays in the space beyond the violet. If these rays are sent through uranium glass, or through solutions of quinine, horse-chestnut bark or some other substances, the rays become luminous, with a pale glow. This phenomenon is known as *fluorescence*. In this way, green crystals, as of fluor spar, may give out blue rays, due not to the color of the body, but to its power of modifying the rays falling upon it. The term *fluorescence* is applied to the phenomenon if it is observed while the body is actually exposed to the source of light; *phosphorescence*, to the effect of the same kind, but usually less intense, which is observed after the light from the source is cut off. Both forms of the phenomenon occur in a strongly marked degree in the same bodies. Canary glass, which is colored with oxide of uranium, is a very







### STATE FLOWERS

1, Columbine: Colorado.  
2, Violet: Illinois, New Jersey,  
Rhode Island, Wisconsin.  
3, Gentian: Wyoming.

4, Pine Cone and Tassel: Maine.  
5, Mistletoe: Oklahoma.  
6, Poppy: California.  
7, Bluebonnet: Texas.

8, Sunflower: Alabama, Kansas.  
9, Golden-Rod: Kentucky, Missouri,  
Nebraska.



Kate Abelman

## STATE FLOWERS

1, Apple Blossom: Arkansas,  
Michigan.  
2, Rose: New York.  
3, Peach Blossom: Delaware.

4, Black-eyed Susan: Maryland.  
5, Sego Lily: Utah.  
6, Red Clover: Vermont.

7, Moccasin Flower: Minnesota.  
8, Wild Rose: Iowa, North Dakota.  
9, Bitter Root: Montana.  
10, Syringa: Idaho.





## Fluorine

convenient material for the exhibition of fluorescence. A thick piece of it, held in the violet or ultra-violet portion of the solar spectrum, is filled to the depth of from an eighth to a quarter of an inch with a faint nebulous light. If the solar spectrum be thrown upon a screen freshly washed with sulphate of quinine, the ultra-violet portion will be visible by fluorescence; and if the spectrum be very pure, the presence of dark lines in this portion will be detected.

**Fluorine**, *flu'or in* or *flu'or een*, a very widely distributed element, known chiefly in combination, though since it was isolated in 1887 by Moissan, it has been known as a colorless, intensely irritating gas, which attacks almost every substance and is the most active element known. Its most abundant compound is calcic fluoride, which not only exists in the mineral kingdom, as fluor spar, but forms an essential part of the bones and teeth of animals. Fluorine has also been detected in the blood and in milk; in plants, in volcanic sublimates, in rocks and in a variety of minerals. Combined with hydrogen, it forms hydrofluoric acid, which is used extensively in etching glass.

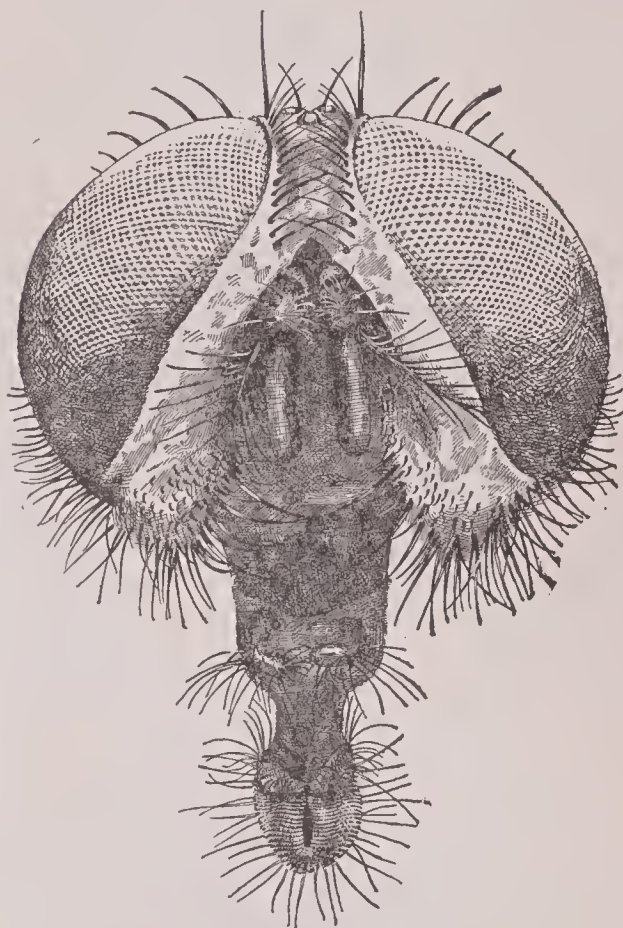
**Fluor Spar**, fluoride of calcium. It is of frequent occurrence, in connection with beds of silver, tin, lead and cobalt ores. It is sometimes colorless and transparent, but more frequently it exhibits tints of yellow, green, blue and red. Fluor spar crystallizes in cubes and the crystalline varieties form beautiful specimens. It is used as a flux in metallurgy and is a source of hydrofluoric acid, which readily etches glass.

**Flute**, a wind instrument resembling a fife, but having more finger holes and from six to a dozen keys, thus giving it a compass of nearly three octaves. It is a very important instrument in an orchestra, and is often used for solo parts. A piccolo is a high, shrill flute.

**Fly**, the common name of many insects belonging to various genera and species, and characterized in general by two transparent wings. Some flies, however, have no fully developed wings. In almost all the species, even in those which have no full-grown wings, there are present two small rod-like organs which take the place of the hind wings and probably serve as balancers in flight. Besides the flies there is only one other insect, a scale-insect, which has but two wings. The head of a fly is usually insignificant, except for the eyes, which are relatively very large and consist often of thousands of facets. There have been, up to the present time, over 40,000 species of flies described. But

## Fly

it is believed by prominent scientists that there are at least four times this number of species, and some place the number as high as 350,000. The difficulties in the way of studying the Diptera or flies, are great, as the insects are very frail and satisfactory specimens are hard to prepare. It is safe to state that a large majority of the insects which affect the lives of men for good or for evil are of this order.



HEAD OF HOUSE FLY

The two large areas studded with thousands of lenses are compound eyes. There are three simple eyes at the top center. The fly can therefore see in every direction. In the center opening are the feelers, or antennae.

The midges, gnats, mosquitoes and fleas all belong to the Diptera, but in common language the word *fly* is often applied to insects which are not strictly Diptera, or true flies, as, for example, the dragon fly and the May fly. The house fly is the most common of the Diptera. Wherever man is, the house fly is found, and in hot weather it causes a great deal of annoyance. It is furnished with a sucking apparatus, through which a fluid may be poured to soften hard substances. It can climb the smoothest surfaces, and even walk on a ceiling, because of the sucker-like hairs which grow on its feet. The female lays her eggs in rotting refuse or in the manure of



## Flycatcher

a barnyard, and the larvae, which hatch in a few hours, are small white maggots, which change into pupae without casting their skins and in from eight to fourteen days become mature flies. As each fly lays more than one hundred eggs, and a new generation can be produced in ten days, it is evident that the increase is astonishingly rapid. A few flies survive the winter in sheltered places and so preserve the species, though it is probable that many of the pupae live through the winter. Flies are undoubtedly a source of contagion and an important factor in the distribution of disease. Not only do they gather the germs in the decaying matter where they lay their eggs and transport them by their bites into the human body, but by crawling over food they may leave the germs to be taken into the stomach. In Egypt and some of the Eastern countries, where the religion of the people prevents them from killing any insect, the flies carry the germs of ophthalmia from one person to another till it is unusual to find an adult human being with perfect eyes. Anthrax and other diseases are communicated among animals by flies, and it is thought that typhoid fever also is distributed in this way. It is very evident that flies should be excluded from the house wherever possible, and a consistent and universal effort to exterminate them would result in diminishing the nuisance very largely. See HORSE FLY; see also NATURE STUDY, Vol. V. *Lessons on Insects*.

**Flycatcher**, a name given originally to a certain bird whose bill is flattened at the base and is almost triangular, notched at the upper mandible and beset with bristles. The bird perches on a branch, where it remains immovable, leaving only to make a sudden dart at a passing insect, which it seizes with a snap of the bill and then returns. Two species are British, and there are many tropical species, some of which are bright-colored, especially the paradise flycatcher, which is frequently represented on Japanese fans and screens. In the United States the tyrant birds, belonging to an entirely different family, but having much the same habits, are commonly known as flycatchers.

**Flying Fish**, a name common to various fishes which have the power of keeping themselves up for a time in the air by means of their large fins. To escape from the attacks of other fishes, especially the dolphin and the mackerel, they often pass through the air to a considerable distance, sometimes as far as two hundred yards. Among the best known species is that of the North Atlantic, also found near the Hawaiian

## Flying Machine

Islands; also the *great flying fish*, measuring eighteen inches in length, found around California, and the *sharp-nosed flying fish*, found around Central America.

**Flying Machine**, a device for navigating the air. Aviation, or travelling through the air, is accomplished by two kinds of machines—aeroplanes, which depend on mechanical action for their flight, and dirigible balloons, which are lighter than air.

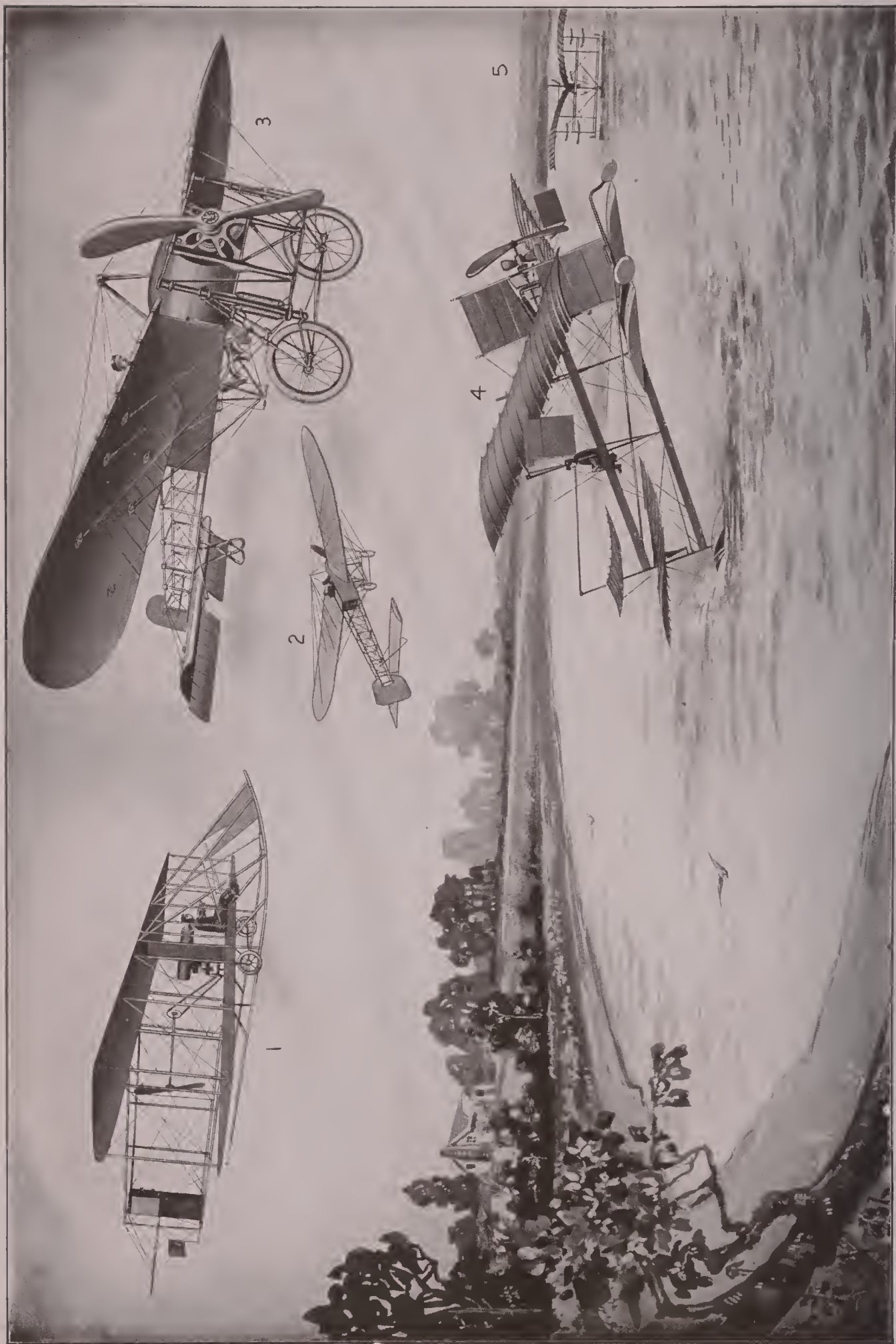
**MECHANICAL FLIGHT.** The earliest experimenters with flying machines naturally enough tried to build a machine which resembled the wings of a bird. Indeed, the first machines of this type, which is known as the aerodrome, were made with movable wings, and the operator, by the use of the arms, attempted to imitate the motions of a bird in flight. It was soon recognized, however, that wings in a stationary position gave far better results. The wings were made by stretching silk over frames of wire, and had a moderate slope upward, being higher at the forward edge. The aerodrome was fitted with a motor and with a rudder for steering. By the use of a sliding weight on a rod extending lengthwise, the head of the machine could be given an upward or a downward tilt, so that it could ascend or descend at the will of the operator.

The most famous of the aerodromes was that built by Samuel Langley, later generally known as "Langley's folly." In December, 1903, Langley tried to fly, but the machine pitched headlong into the Potomac. In February, 1906, Langley died, broken-hearted. It was proved that his theories were correct, when Glenn Curtiss, on May 28, 1914, made a successful flight in the identical machine with which Langley had failed. Curtiss mounted the machine on floats and rose from water, whereas Langley had tried to rise from a platform by means of an elaborate launching mechanism.

**AEROPLANES.** The aeroplane depends entirely upon its reaction against the air for its support above the ground. It consists of one or more planes, consisting of a strong, light frame, covered with some light material, against which the air will react, and usually having a slightly curved surface. To the plane are attached by framework, motors, propellers, rudders and such other devices as may be necessary to enable the machine to keep its equilibrium in the air. Aeroplanes are of two general types, biplanes and monoplanes. The first is illustrated by the machine constructed by Wright brothers at Dayton, Ohio.







FLYING MACHINES

(1) Wright Biplane. (2-3) Bleriot Monoplane. (4) Fabre Hydroplane descending to surface of water. (5) Hydroplane running on water.

## Flying Machine

*The Wright Aeroplane.* The Wright machine consists of two planes about forty feet long by six feet wide, and placed about six feet apart. The planes are connected by uprights, which are so joined to the planes and braced as to form a strong, light frame. The planes are mounted on two long runners, which extend in front about ten feet and curve upward in order to act as a support for the horizontal rudder, which consists of two small planes, one above the other. These planes are about fifteen feet long and two and one-half feet wide. This rudder is connected with a lever by the operator's seat, which is placed on the front edge of the lower plane. By moving this lever forward or backward, the operator directs the machine upward or downward at will. The frames of the large planes are flexible, and their outer ends are also connected with this lever. By moving the lever sidewise, the curvature at one end is increased, while it is lessened at the opposite end. This keeps the machine from tipping. There are two vertical rudders placed about the same distance in the rear as the horizontal rudder is in front, but operated by a separate lever. The aeroplane is driven by a thirty horse-power gasoline engine, which operates propellers, whose construction resembles that of boat propellers. One of these machines complete weighs 800 pounds and has an average speed of over forty miles an hour.

The success of the Wright machines has been proven in Europe and the United States. The right to use their patents was sold to the French government for \$100,000, and in October, 1909, Orville Wright, in an exhibition in Berlin, rose to the height of 1600 feet. During the Hudson-Fulton Festival in New York, Wilbur Wright made a flight from Governor's Island up the Hudson to Grant's Tomb and returned to his starting point. In the United States the machine has met the test of the army, and is being used in connection with the military balloon service.

The Curtis biplane is similar in plan and structure to the Wright machine, and is practically as successful. SEE BALLOON.

*The Monoplane.* This consists of only one large plane, otherwise its construction and operation are on the same principle as those of the machines described above. It was with a monoplane that Berliot crossed the English Channel July 25, 1909.

At the great aviation meet at Rheims, France, in August, 1909, thirty-eight aeroplanes were entered and these were about equally divided between biplanes and monoplanes.

## Flying Machine

*The Hydro-aeroplane.* This is an aeroplane built, not on runners, but on floats or on a hull so that it may rise from the water. The first successful hydro-aeroplane was that of the French aviator Fabre, who perfected his machine in 1910. The first successful American hydro-aeroplane was exhibited by Glen Curtiss in January, 1911. The Curtiss hydro-aeroplane of 1911 was equipped with floats in place of the usual landing skids, but the later models have a specially built, water-tight-body.

**DIRIGIBLE BALLOONS.** The dirigible balloon or air ship uses a bag inflated with gas lighter than air for raising it above the ground. The balloon, called the hull, consists of a long, cylindrical bag, pointed at both ends. The space enclosed may be occupied by separate bags, as in the Zeppelin ship, or it may be undivided as in balloons of the Lebaudy type.

*The Zeppelin Air Ship.* The Zeppelin air ship is the most perfect type of this class of machines. The hull has a strong frame, consisting of octagonal metallic rings, fastened together by wire cables. This renders the hull rigid and enables it to withstand wind pressure without damage. Within the frame are seventeen or eighteen drum-shaped bags, entirely distinct from each other but filling the entire space. The frame is covered with an air-tight envelope of the best balloon cloth. The air space between this envelope and the gas chambers within the frame is of great value in maintaining the gas in the chambers at equal volume, by keeping it at an even temperature. Rudders, which are practically small aeroplanes similar to those described, are attached to the sides of the hull fore and aft. A strong frame is suspended beneath the hull. This contains the motors, propellers, cabins for the operators and passengers, and such supplies as are necessary for the voyage. As usually constructed, the hulls of the Zeppelin ships are from 400 to 550 feet long and about 50 feet in diameter. They have a lifting power from four to five tons, carry two, three or four motors of about 200 horse-power each, and have an average speed of thirty-five miles an hour.

Previous to January, 1910, more than 200 voyages had been made by Zeppelin air ships, covering distances from 50 to 900 miles and varying in duration from one to thirty-six hours. A company was organized in Germany in 1909 for the construction of Zeppelin air ships, to be used in carrying passengers. From the beginning of this passenger service in June, 1910 up



## Flying Squirrel

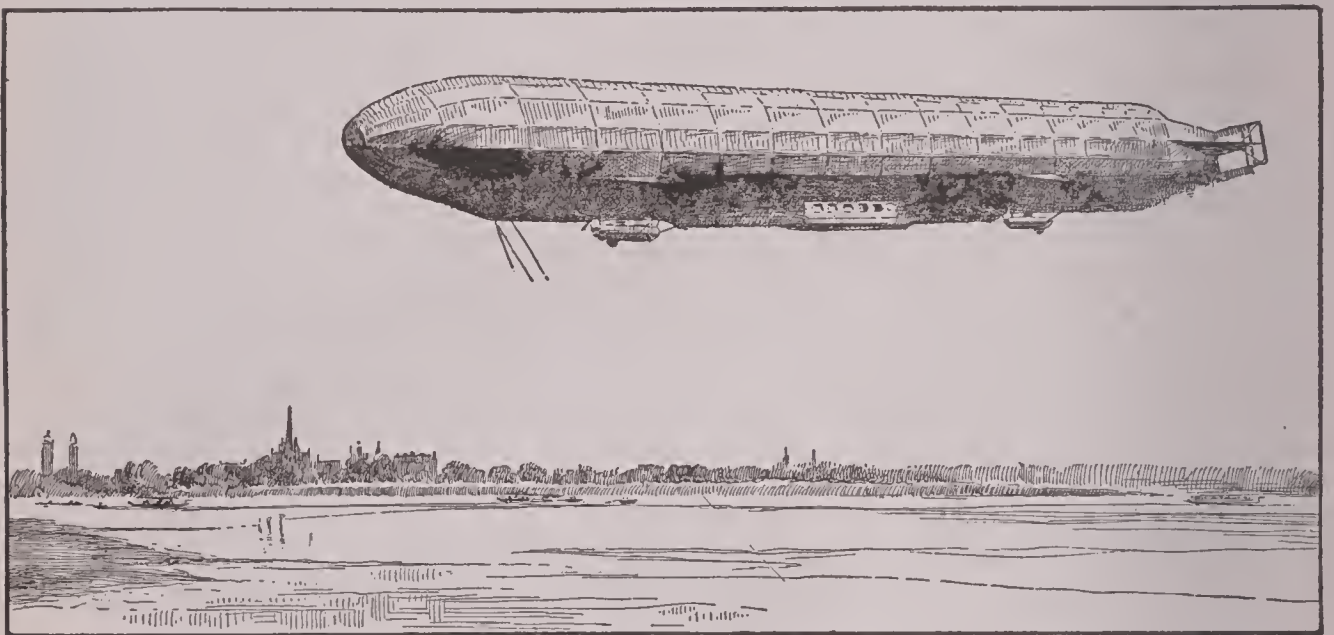
to the end of 1913, seven dirigibles had been employed and about 25,000 passengers carried.

**FLYING MACHINES IN WAR.** For a number of years the various kinds of airships attracted attention because of their possibilities in war. The United States, Great Britain, Germany and France have been the leaders in experiments with aeroplanes and dirigibles. In the War of the Nations, which broke out in 1914, the aeroplane was used extensively for scouting purposes. Indeed, it is no exaggeration to say that the aeroplane has made impossible the secret movement of large bodies of troops. Military aeroplanes are usually equipped with one small machine gun, firing about 750 shots a minute, and each aviator in addition carries a revolver and rifle. In the use of the dirigibles Germany

## Fomentation

fly, but it can run high up a tree and then leap out and, spreading its wings wide apart, sail for a considerable distance, perhaps to the foot of another tree. The flying squirrel of the United States is about five inches long, and has a tail of nearly the same length. The fur, which is very soft, is grayish on the upper parts and white below.

**Fog or Mist,** a cloud at or near the surface of the earth, produced by the condensation of the invisible vapor of the atmosphere into minute, watery particles. This condensation is caused by a cold current of air or the presence of a cold surface, as that of an iceberg. Fogs are more frequent in those seasons of the year when there is a considerable difference of temperature in the different parts of the day. Recent experiments would seem to show that there is an intimate



A ZEPPELIN AIRSHIP NEAR POTSDAM, GERMANY; DRAWN FROM A PHOTOGRAPH

has taken the lead, but the Zeppelins, in the early months of the war, did not prove of great assistance to the armies. They were used to drop bombs on Paris and other cities, but did little damage; they were also used for scouting, but were not superior, for this purpose, to the aeroplane. A dirigible usually carries a battery of three or four guns, considerably larger than those used on aeroplanes.

**Flying Squirrel,** a curious little squirrel that lives in the woods, where it sleeps during the daytime and hunts for food at night. If the stories are true, it does not confine itself to nuts and herbage, but eats the eggs of birds and even the young, when it can obtain them. The remarkable thing in its structure is the long flap of fur-covered skin that extends from the fore legs to the hind legs. The squirrel cannot really

connection between fogs and the invisible dust of the atmosphere; that in fact the invisible atmospheric dust is not only necessary to the formation of fogs, but also of clouds and rain.

**Folk,** JOSEPH WINGATE (1869- ), an American statesman, born at Brownsville, Tenn. He graduated at Vanderbilt University and was admitted to the bar in 1890. Removing to Saint Louis, he rose rapidly in his profession, becoming circuit attorney in 1900. In this position he won fame for his vigorous and fearless prosecutions of bribery cases in the council. He was governor of the state as a Democrat from 1905 to 1909. In 1913 he was made solicitor of the Department of State at Washington, D. C. (See illustration on next page.)

**Fo'menta'tion,** in medicine, the application of warm liquids to a part of the body, by means

## Fond du Lac

of flannels or other cloths, dipped in hot water or medicated fluids, for the purpose of driving tumors away or of easing pain by relaxing the skin.

**Fond du Lac'**, Wis., the county-seat of Fond du Lac co., 63 mi. n. w. of Milwaukee, on Lake Winnebago and on the Wisconsin Central, the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. By way of the Fox River the city has water connection with the Great Lakes. The important manufactures



JOSEPH W. FOLK

include lumber, flour, paper, machinery, furniture and agricultural implements. The city has a picturesque location, contains a public library and Saint Agnes Hospital and Sanatorium, and is the seat of Grafton Hall, an Episcopal school for girls. The place was settled in 1836 and was chartered as a city in 1852. Population in 1910, 18,797.

**Font.** See TYPE.

**Fontainebleau**, *fohN tan blo'*, a town of France, in the Department of Seine-et-Marne, in the midst of a forest of the same name, about 2 mi. from the Seine and 37 mi. s. s. e. of Paris. The town is famous for its palace and its forests. The castle, or palace, of Fontainebleau is one of the most magnificent in France. It occupies the site of a fortified chateau, founded by Louis VII in 1162; this was converted into a magnificent palace by Francis I and was much enlarged by succeeding monarchs until its completion in the

## Food

eighteenth century. The park is laid out like a vast garden and is adorned with statues, temples, fountains, lakes and waterfalls. The forest, which is about 50 miles in circumference, covers an area of 42,500 acres, affords numerous pleasant walks and abounds with game.

**Fontenoy**, *foNt nwah'*, a village in Belgium, in the Province of Hainaut, celebrated for the battle of May 11, 1745, in which the French under Marshal Saxe defeated the British, Austrian and Dutch allied forces under the Duke of Cumberland.

**Foo-chow'**. See FU-CHOW.

**Food**, a term which includes everything, solid or liquid, that serves as nutriment for the body. All food must contain nutritious matter of some kind, which, being extracted by the act of digestion, enters the blood and supplies the material for growth and repair and for keeping up the heat of the body. It must also be composed in a greater or less degree of soluble parts, which easily lose their peculiar qualities in the process of digestion and correspond to the elements of the body. Foods have been classified usually as *flesh-makers* and *heat-makers*. The former, or nitrogenous foods, such as meat, the white of eggs, milk and cheese, foods rich in albumen, are known as proteids and albuminoids. The heat-makers, or non-nitrogenous foods, contain sugar, starch and oils. Some nitrogenous foods may be used as heat-makers in the absence of others. The albuminous substances are indispensable, inasmuch as they form the material by which the constant waste of the body is repaired. Water and salts are usually considered as forming a third group, and in the widest sense of the word *food*, oxygen alone, which enters the blood in the lungs, forms a fourth. The articles used as food by man do not consist entirely of nutritious matter, but with few exceptions are compounds of various nutritious, with indigestible and accordingly innutritious, substances. Albuminous substances are contained largely in animal food, but some vegetable foods also contain much albumen, as peas, beans and lentils, the cereals, wheat and oats. The principal non-nitrogenous substance obtained as food from animals is fat, and sugar is obtained in smaller quantities from milk. Sugar, water and salts may pass without any change into the circulatory system; but albuminous matter must first be rendered soluble and capable of absorption in the stomach and intestines. Starch must be converted into sugar, and fat must be emulsified, chiefly by the action of the pancreatic juice. One of the objects of



## Food

cooking is to make our food more easily acted upon by the digestive fluids.

Milk stands at the head of the list of foods, as it is rich in the best elements, in about the right proportion. Of the different kinds of flesh, each of which has its peculiar properties, beef is considered the most nourishing, while mutton and chicken are more delicate and more easily digested. Pork and veal are not very nutritious and are difficult to digest. The flesh of fish is rich in phosphorus. Eggs are a valuable food, rich in albumen, and contain some fat and sulphur. Vegetables, or those plants whose roots, stems or leaves are eaten, are best represented by the potato, which is cultivated in all parts of the world, except the very hot or very cold regions. It contains a large per cent of water, with starch and a small quantity of nitrogenous matter. Beets, carrots, parsnips, cabbage and turnips have a value, and some or all should form a part of a person's food. Fruits contain a large per cent of water, but they furnish sugar, and each has an acid peculiar to itself. Grapes are most valuable, and then come, in order, apples, cherries, pears, peaches and the small fruits, or berries. Seeds, such as peas, beans and lentils, contain a large proportion of nitrogen, while rice, wheat and oats have more starch. Rye and barley are not so valuable for food. Nuts are rich in albumen and fats and have a larger per cent of food material than the grains, but are not so easily digested. Starchy foods, such as sago and tapioca, are prepared from vegetables. Sugar is found in almost every form of vegetable food.

The wholesome or unwholesome character of any food depends, in a great measure, on the state of the digestive organs and also on the method in which it is cooked, a simple food often being made indigestible by poor cookery. The digestive power of the individual is always to be considered in determining whether a particular food is wholesome or not. In general, therefore, we can only say that that food is healthy which is easily soluble and is suited to the power of digestion of the individual. Man is fitted to derive nourishment from both animal and vegetable food, but can live exclusively on either. The people of hot countries live largely on vegetable foods, while the inhabitants of the most northern regions live almost entirely upon fat, on account of its heat-giving property.

Food should always be kept clean and should be handled with particular care to prevent the collection of impurities. This means not only

## Fools

to protect it from visible dirt, but to be sure it contains no germ that will give disease to the person who eats it. Fruit and vegetables kept in dirty streets and peddled from dirty carts may carry the germs of consumption; water and milk may contain typhoid germs, and meats may have parasites that cause much trouble. They can be killed by thorough cooking. See DIETETICS; DIGESTION.

In late years powerful agitation has been developed in opposition to the adulteration or the fraudulent advertising or sale of foods and medicine. It was found that this practice had been followed with impunity by unscrupulous manufacturers and dealers in all parts of the country. Products of every description—milk, butter, flour, oils, spices, extracts, tea, coffee, preserved fruits, syrups, baking powders and many others—were found to contain foreign substances, often of the most injurious character. State laws against the sale and manufacture of such products were nullified in part by the lack of power to control the quality of products manufactured in other states and shipped direct to consumers. After a long fight in Congress, a national law was passed in July, 1906, prohibiting interstate or foreign commerce in injurious or fraudulent drugs, foods and liquors, and requiring each package of such products transported between states to be plainly and honestly labeled as to contents. Further, it was provided that where a package was marked as of a certain weight, it must contain that weight, absolutely and not approximately. The determination of the quality of foods and the amount and effect of injurious adulterants is to be determined by the courts in each case. See ADULTERATION.

**Fools, FEAST OF**, the name given to festivals regularly celebrated by the clergy and laity, from the fifth to the sixteenth century, in several countries of Europe. The feast of fools was an imitation of the Roman Saturnalia, and, like this, it was celebrated in December. The young people, who played the chief parts, chose from among their own number a mock pope, archbishop, bishop or abbot and consecrated him with many ridiculous ceremonies, in the chief church of the place, giving such names as Archbishop of Dolts, Abbot of Unreason, Boy Bishop, Pope of Fools. They often travestied the performance of the highest offices of the Church, while others, dressed in different kinds of masks and disguises, engaged in indecent songs and dances and practiced all possible follies in the church. Except from their association with the

## Foot

Saturnalia, nothing is known of the origin of these extravagances, which appear to have been very ancient. They were most common in France, but the feast was also observed in Spain, Germany, England and Scotland. In France it survived till the year 1644.

**Foot**, a measure of length in the English system, containing 12 linear inches. A *square foot*, a unit of surface measurement, is equivalent to a square, each of whose sides is one foot, and is therefore equal to 144 square inches. A *cubic foot*, a unit of cubic measurement, is equivalent to a cube whose side is one foot, and it contains 1728 cubic inches. The foot is a common measure in various countries, but its dimensions vary considerably. It was originally derived from the length of the human foot, hence its name.

**Foot**, **THE**, in man and other vertebrate animals, the lower extremity of the leg, upon which the body rests in standing or walking. In man it extends from the ankle joint to the end of the toes. It includes the *tarsus*, or ankle, made up of seven bones, the *metatarsus*, or instep, made up of five bones, and the *phalanges*, or toes, each of which has three bones, except the great toe, which has but two.

**Foot and Mouth Disease**, a severe infectious disease, which for more than a hundred years has frequently broken out among cattle, pigs and other even-toed domestic animals in Europe and frequently has spread to Asia and Africa. Both mild and severe forms of the disease are known. In the former there is some fever and weakness, during which eruptions appear, especially in the mouth and between the hoofs. Not a large per cent of these cases are fatal, but in the graver form as high as twenty per cent of the animals affected may die. It is particularly fatal among young lambs, and in sheep the eruptions are more persistent and serious, especially on the feet. The bacterium which produces the disease has not been recognized, but it is known that infection may be carried by water and that the bacteria thrive in dark and damp places. Inoculation with serum has not been successful in either preventing or curing the disease. Whenever the disease has been present in a stable, the building should be disinfected and its use should be abandoned for a period. Milk from diseased animals conveys the contagion to man.

**Football**, a very general and favorite outdoor game, played in the cool weather of autumn. In the United States it is the popular sport in the colleges and public schools from the opening

## Football

of the fall term till about Thanksgiving time, and no game has ever attracted wider attention or been played with greater interest and vigor by the youth of any land. The game as played in the United States is the *American Rugby* game and differs materially from the Rugby football of the English school. Football is a very ancient game. The Greeks played it, and so did the Romans, the latter using both hands and feet, as do the players of the modern Rugby game. In its early days football was desperately rough, but had not developed into the highly scientific warfare that characterizes it to-day. The English game was played by the schoolboys of England for many years, but no uniformity of rule was known until about 1863; and in 1871, at a general conference, the games as now played in the United States and England were thoroughly outlined. The American game developed on lines of its own and has reached a stage of such remarkable perfection that the players can only achieve success by long and hard training and incessant practice. In the colleges, coaches drawing high salaries give their entire thought to the teams they are training during the fall season, and efforts are always being made to draw the promising athletes of the preparatory schools into the university teams. The important games between colleges or schools of any association draw out great crowds, who are wildly enthusiastic over the good plays made by their team, which they encourage by songs and yells without number. The enthusiasm of the students spread among the people, and to so great an extent that a general reformation in the game was called for, and in the winter of 1905-1906 committees of instructors, coaches and representative college men in different parts of the country consulted together, with the aim of so changing the rules and conditions of play as to eliminate unnecessary roughness and liability to injury; to emphasize the clean, forceful amateur contest in opposition to unsportsmanlike and professional play, and to improve the game from the spectator's point of view by giving greater opportunity to watch the movement of the ball while in play. To secure the desired ends many changes in the rules were proposed, the most important ones being directed toward increasing penalties for foul or rough play; increasing the distance through which the ball must be carried in three trials, thus encouraging "open" play; limiting the number of occasions when time can be taken out without incurring penalties; prohibiting linemen from dropping back of the line



## Football

until the ball is in play, unless they stand at least five yards from the line, thus discouraging dangerous mass formations.

The American Rugby game is played by two teams of eleven men each, on a field 360 feet long and 160 feet wide. This field is divided by a cross line in the center; and parallel to that line cross lines are drawn every 5 yards to the goal lines. A similar line is drawn through the center of the field lengthwise, and parallel lines follow this 5 yards apart, giving to the entire field a checker board appearance. In the middle of each end are two long, upright posts, more than 20 feet in height and 18 feet 6 inches apart. A horizontal crossbar 10 feet from the ground connects them. The object of the game is to carry the ball across the goal line of the opposing team or to kick it over the crossbar of the goal posts. When the ball is carried over the goal line, a *touchdown* is scored, and it counts six points for the team that carries the ball. After a *touchdown*, the ball is brought out into the field, and a member of the team that made the touchdown has what is known as a *free kick* for goal. If the ball passes over the crossbar between the goal posts, it scores one point. Under certain conditions the ball may be kicked over the crossbar from the field during the progress of the play, and by this three points are scored for the side making the kick. If a person holding the ball is forced across his own goal line, it is called a *safety* and scores two points for the opposing team. A game consists of four quarters of 15 minutes each, with an intermission of 15 minutes between the second and third periods, and one minute between the first and second and between the third and fourth. After every touchdown or goal from field, the teams change goals; at the beginning of the third period the teams take opposite goals from those assumed at the beginning of the game. At the beginning of a game the ball is placed on the ground at the center of the field. The side which has the right to kick off ranges itself in a line across the field, while the defending side distributes its men over its own side of the field, in positions which are most advantageous to catch and return the kicked ball. At a given signal the ball is kicked and the line of players rushes forward. One of the opposing players catches the ball and runs with it toward the goal of the kickers-off, as far as he may before he is "tackled" and thrown by one of his opponents. He need not have run with the ball, but might have kicked it back to his opponents, but as this would give

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them possession of the ball, it is a play not often resorted to. When the player with the ball is downed, an official blows a whistle, and the two teams line up with their backs toward their own goals in the positions indicated in the following diagram, in which the squares represent the attacking team, and the circles the defending team. The men on a team are the *center* (C), two *guards* (G), two *tackles* (T), two *ends* (E), a *quarterback* (Q), two *halfbacks* (H) and a *fullback* (F). The men in pairs are distinguished by the word right or left, according as they stand to the right or the left of the center of their own team. Thus, the right guard stands at the right hand of his center. The names of the positions the men occupy are indicated on the diagram (Fig. 1) and, with slight modifications,



FIG. 1

are the positions they occupy whenever the teams are thus lined up for a scrimmage. The central men of the attacking team stand close together in a stooping posture, the center with his hands on the ball, which lies on the ground between his feet and in front of them. One of the players, usually the quarterback, calls the signals, which indicate what particular play is to be used. Then, after the quarter has signaled to the center that he is ready to receive the ball, the latter passes it quickly between his legs to the quarterback, who seizes it and gives it to one of the men behind him or to one of the men in the line, who takes the ball and attempts, with the aid of his companions, to run through or around the line of the defending team and toward their goal, until he is tackled and thrown. Here the teams form again for another scrimmage, when a new play is executed in a similar way. If within a specified number of trials a certain distance is not made, the attacking team must give up the ball to their opponents, who then become the attacking team and try to carry

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the ball toward the opposite goal. It is permissible for the attacking team to kick the ball instead of to carry it, if they prefer, and this is usually done, at least on the last trial, when, if they fail to make the required distance, the team would be obliged to give up its ball. Whenever a team comes within striking distance of its opponent's goal, it may form in a different manner and attempt either a *drop kick* or a *place kick*, and if either is successful a score is made as indicated above. If the kicker fails to make goal, the ball is brought out to the 25-yard line and there kicked off to the other team by the defenders of the goal, in the same manner as at the beginning of the game.

Football calls for great strength on the part of some of the players; for speed and agility from others, and for quickness of thought and loyalty to team-mates from all. No team can succeed that does not play as a unit. Each man must not only know the duties of his own position accurately, but he must know how to play it to the best advantage of the rest of the team and must know when and how to assist each of the others. When the signals are given and any specific play is called for, every man on the team knows exactly what he is expected to do, and the play is successful only when each man does as nearly as possible that which he is expected to do. The many competent coaches have succeeded in devising a great number of effective plays, which may be grouped in two classes, those special plays which are good only occasionally, or are in the nature of surprises, and the standard or regular plays, which are repeated again and again with only such slight modifications as are necessary to deceive the opposing team. Of the standard plays, two types are most common. In one of these the players try to carry the ball directly through the line of the opponents, and in the other they carry it around the end of the opponent's line. It is evident that both of these types are susceptible of a great number of variations, dependent upon the person who carries the ball and upon the particular point to which he directs his attack. Figure 2 shows what is done by the attacking team when the fullback tries to go between his center and right guard, and, with the assistance of the men behind him, carry the ball through the line of his opponents. The short double lines show where the ball is tossed; the black circle and the heavy black line indicate the man with the ball, and his course; the solid lines show the paths of the men who precede the ball,

## Foote

and the dotted lines show the courses of the men who follow behind the ball and push. In Figure 3 the course of the players trying to take the ball around the right end is shown. The lines have the same meaning as in Figure 2. It

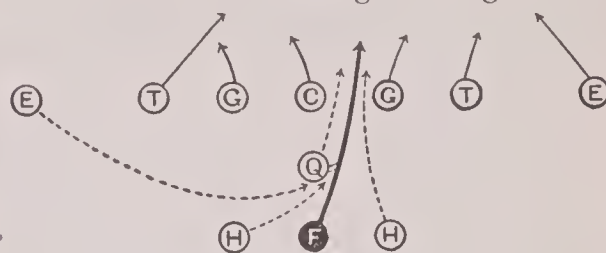


FIG. 2

should be noticed in this that the quarterback and the right halfback go between the men carrying the ball and the opposing team, to form what is called the *interference*.

Several officials are required to interpret and enforce the rules in each game—the *referee*, whose specific business it is to watch the ball;

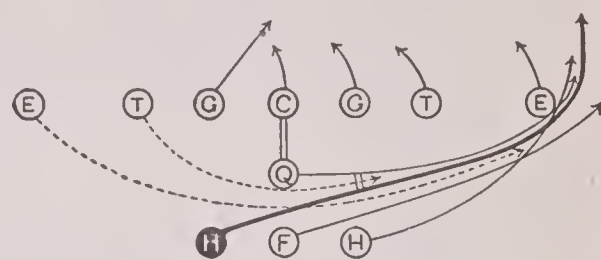


FIG. 3

the *umpires*, who watch the conduct of the players; the *linesmen*, who determine how far the ball has been advanced, count the time taken out and are also responsible for detecting certain classes of fouls, especially offside play and roughness. The football quarter consists of 15 minutes of actual play, and whenever the game is stopped for any reason, time is "taken out." The rules of the game are so numerous and complicated, and they change so from year to year, that the only way of being certain of them is to study the current manual.

**Foote**, ANDREW HULL (1806-1863), an American naval officer, born in New Haven, Conn. He studied at West Point and entered the navy December 4, 1822. He was promoted rapidly, being given command in succession of the Boston and the Brooklyn navy yards, and in December, 1852, he was given the rank of commander. He saw service with the East India squadron and in August, 1861, was given command of the fleet in the Southwest. In February, 1862, he coöperated with Grant in the capture of Fort Henry and bombarded Fort Donelson, but without effect. With Pope he compelled the surrender of Island



No. 10 in April. In July, 1862, owing to the serious effect of a wound received before Fort Donelson, he left the western fleet, became chief of the bureau of equipment and recruiting and in June, 1863, was appointed successor to Rear Admiral Dupont, in command of the fleet off Charleston, but he died before assuming the duties of this position.

**Foote**, ARTHUR (1853- ), an American musical composer, born at Salem, Mass. He studied music with the foremost American teachers and also graduated from Harvard University. Soon after graduation, he appeared in concert, as performer upon the piano and organ, and also attained some distinction as a composer. Among his well-known compositions are the *Trio in C Major* for piano and stringed instruments; a *Serenade in E Major*; an overture, *In the Mountains*; many pieces for the organ and for church choruses, and about sixty songs, many of which are extremely popular, notably, *I'm Wearing Awa'*, *O Swallow*, *Swallow* and *In Picardie*. He also has written musical settings for well-known poems, including Longfellow's *The Wreck of the Hesperus*, *Skeleton in Armor* and *Hiawatha*.

**Foote**, MARY HALLOCK (1847- ), an American author and artist, born in Milton, N. Y. She married a mining engineer and lived after her marriage in Colorado, Idaho and California. Much of the material for her novels she drew from her experiences there. *The Desert and the Sown*, *The Prodigal*, *Coeur d'Alene* and *The Led Horse Claim* are some of her works. She also produced many pen and ink sketches for magazine and book illustrations.

**Foot Pound**, in physics, the term expressing the unit selected in measuring the work done by a mechanical force. A foot pound is the work done by a force of one pound working through a distance of one foot. It is the unit of the English system for measuring force.

**Foot Rot**, a disease in the feet of sheep, the more common form of which is an extensive growth of hoof, which at the toe, or round the margin, becomes turned down and cracked or torn, thus affording lodgment for sand and dirt. In the second form of the disease the foot becomes hot, tender and swollen. Ulcerations form between the toes and are followed by the sprouting of proud flesh.

**Foram'inif'era**, a group of protozoans remarkable for their beautiful shells, some of which are spirally coiled and look like those of the nautilus. They resemble the amoeba in manner

of life, but reproduce themselves in all three of the ways recognized among protozoans. They live an independent life and move themselves about by a minutewhip-like projection. Although some are found in fresh water, most of them are salt water animals. The animal deposits of chalk, found both in Europe and America, are composed principally of the fossil shells of foraminifera.

**Forbes**, *forbz*, ARCHIBALD (1838-1900), an English journalist, born in Scotland. He studied at Aberdeen, served with the Royal Dragoons and began journalistic work in London in 1865. As field reporter for the London *Daily News* during the Franco-German War, he accompanied the Prussian army throughout the campaign and entered Paris at the close of the struggle. He also served as war correspondent during the Servian War and during the Russo-Turkish War in 1877. Among his publications are a *Life of Chinese Gordon*, *Napoleon III* and *My Experiences in the Franco-German War*.

**Forbes**, JOHN, Sir (1787-1861), a Scottish physician, a homeopathist, phrenologist and believer in mesmerism. His first works were translations of the writings of Avenbrugger and Laennec on auscultation and the use of the stethoscope. To the *Cyclopaedia of Practical Medicine*, of which he was joint editor, he contributed some of the best articles. He was the founder of the *British and Foreign Medical Review* and published a number of professional and other works.

**Forbes-Robertson**, SIR JOHNSTON (1853- ), an English actor, born in London and educated at Charterhouse and the Royal Academy of Arts. His intention was to become a painter, and he showed decided talent, but at the age of twenty-one he went on the stage, and gained steadily in art and in popularity until he became one of the foremost of English actors. At various times he played with Mary Anderson, Sir Henry Irving and Mrs. Patrick Campbell. Among the plays in which he was especially successful are *Hamlet*, *Pelleas and Melisande*, *Shaw's Caesar* and *Cleopatra* and *The Passing of the Third Floor Back*.

**Force**, *fors*, in physics, that agency by which the motion of a body is increased, diminished or changed in direction. In mechanics the force is measured by the velocity it produces in a given mass in a definite portion of time, as upon one pound of mass in one second. The illustration of the effect of a constant force upon a moving body is shown in the laws of falling bodies (See

FALLING BODIES). There are two systems for measuring force, the English system, which uses the poundal as the standard of measure (See POUNDAL), and the Metric system, which uses the dyne (See DYNE).

A central, or *centripetal*, force is one that draws toward the center; it is illustrated by gravitation, which draws all bodies toward a common center, about which they move. *Centrifugal* force is a term frequently used to denote the force which gives a revolving body a tendency to fly off in a straight line known as a *tangent*. A good illustration of this is a stone thrown by a sling, and mud or water thrown from the rim of a rapidly revolving wheel. The *field* of a force is the area within which it acts. In case of gravitation this field is infinite, but in mechanics it is restricted to the area within which the force produces visible effects, as the field of force of a magnet is the area within which its effects are noticeable (See MAGNET).

**Force**, *fors*, PETER (1790-1868), an American scholar and historian, born at Passaic Falls, N. J. He became a printer in New York City, but soon removed to Washington, D. C., where, in 1820, he began the publication of the *National Calendar*, an annual periodical dealing with governmental statistics. This he continued to publish until 1836. During a part of the time he was editor and proprietor of a prominent National Republican newspaper. For a time he was mayor of the city of Washington. Force is most widely known for his *American Archives*, which were published by authority of an act of Congress and which deal with the history of the English colonies in America from 1765 to 1776. A large number of his books and pamphlets, dealing with American history and politics, were purchased by the United States government in 1867, and form a valuable part of the Library of Congress.

**Force Bills**, several laws passed by the United States Congress. The first became a law March 2, 1833; it aimed to compel the acceptance of the tariff law, especially by South Carolina, which had passed a resolution of nullification. The bill was also known as the "bloody bill."

During the reconstruction period, after the passage of the Fourteenth and Fifteenth Amendments, Congress passed a second so-called Force Bill May 31, 1870. It made punishable by fine or imprisonment any attempt to intimidate, bribe or hinder qualified voters from expressing themselves at the polls. April 20, 1871, another

bill, also known as the Force Bill, was passed by Congress, directed against the Ku-Klux Klan and similar societies, organized systematically to evade Federal laws in the South.

The name *Force Bill* has also been applied to the Lodge election bill, passed by the House of Representatives, July 2, 1890, by which the control of certain elections was placed with the Federal government. It was defeated in the Senate.

**Forceps**, *for'seps*, a general name for a two-bladed instrument, on the principle of pinchers, or tongs, used for seizing and holding and for extracting objects which it would be impracticable thus to treat with the fingers. Such instruments are used by watchmakers and jewelers in delicate operations, by dentists in forcibly extracting teeth and by surgeons for grasping and holding parts in dissection, for extracting anything from a wound and for taking up an artery. See PINCHERS.

**Ford**, PAUL LEICESTER (1865-1902), an American novelist, author of *The Honorable Peter Stirling*, *The True George Washington*, *The Writings of Thomas Jefferson* and *Janice Meredith*. Mr. Ford was born in Brooklyn, N. Y., was educated there in private schools and traveled extensively. He was a cripple and consequently did not enjoy the customary schooling. His attainments, therefore, are the more worthy and remarkable.

**Foreclo'sure**. See MORTGAGE.

**For'eign Law**. See LAW.

**Foreign Money**. See MONEY.

**Foreign Trade**. See COMMERCE; also, discussion of commerce in the articles on the several nations.

**Foreshort'ening**, in drawing and painting, the art of representing figures in such a manner as to convey to the mind the impression of the entire length of any object, though only a part of this length is actually shown. An object viewed in an oblique direction is foreshortened. In drawing an object in such a position, less space would be covered than if the object stood straight in front of and on a level with the observer. The method was known to the ancients, and in later times it was practiced by the great masters and especially by Correggio.

**For'esters**, ANCIENT ORDER OF, a fraternal society, founded in 1745 in Yorkshire, England. It was introduced into the United States in 1836, the first court being at Philadelphia. In 1911 there were in existence over nine thousand courts, with a membership of 1,292,900, of whom 43,500



## Foresters

were in the United States and Canada. The society has dispersed, since 1836, more than \$130,000,000 in benefits.

**Foresters, INDEPENDENT ORDER OF**, a fraternal organization, founded at Newark, N. J., in 1874 and reorganized in 1881. It has branches in Canada, Great Britain, Norway, France, India and Australia. There are 57 high courts, each having jurisdiction in one state or country. There are about five thousand subordinate courts, with a total membership of over 242,000. The organization has dispersed about \$32,000,000 in benefits.

**Foresters of America**, a fraternal society founded in 1864 and reorganized in 1889. It was formerly a part of the Ancient Order of Foresters, but became a separate organization at the latter date given above. It has 18 grand courts, about two thousand sub-courts and a total membership of 235,000. Since its reorganization, it has dispersed about \$32,000,000 in benefits.

**For'estry**, the art of cultivating and managing forests. Forestry has been practiced in Europe for a long time, and in most European countries all forests, whether private or public, are under government supervision and must be managed in accordance with carefully prescribed regulations concerning the cutting of timber, the planting of trees and the protecting of young growths. Germany has the most perfect system of forestry, and her foresters are the best prepared and most skillful in the world.

The first settlers in the United States proceeded to clear the land by felling trees and burning the timber, because the forests were an obstruction to the cultivation of the soil. Timber was abundant, and there was little use for it; hence the most wasteful methods of disposing of it were adopted. Unfortunately, succeeding generations inherited the attitude of their ancestors towards the forests and for nearly two centuries the most ruthless destruction was continued. In 1890 active measures were taken to preserve the forests under government ownership. This led to the development of the division of forestry under the department of agriculture, and in 1901 this became the bureau of forestry. In 1905 the title became the forest service and the powers were greatly enlarged, enabling it to assume adequate control of the forests.

The work undertaken by the service is along the following lines: The creation and maintenance of forest reserves, the prevention of forest fires, the reformation of the present

## Forestry

methods of lumbering, the re-foresting of denuded areas, the assisting of private owners in caring for forests and woodlands, and co-operation with the different states in their attempt to preserve forests within their boundaries.

In 1891 Congress passed a law authorizing the president to set aside public lands wholly or partially covered with timber as national forest reserves. In accordance with this act, the Yellowstone Forest Reserve was proclaimed by President Harrison, and soon after, fourteen additional reserves were created by President Cleveland. Succeeding administrations have added to these, until forest reserves having a combined area of over 172,230,000 acres have been established. These are located in Alaska, Arizona, California, Colorado, Idaho, Montana, Nebraska, New Mexico, Oklahoma, Oregon, South Dakota, Wyoming and Washington. In addition to these there are a number of state reservations, which have been created by state legislatures. Most of the forest reserves are located around the head waters of the great rivers, such as the Mississippi, Missouri, Yellowstone and Columbia. The reserves are so managed as to enable them to contribute to the greatest good of all the people. Lumbering within the limits of the natural growth of the forests and under the direction of the agents of the bureau of forestry is allowed, as is grazing under certain conditions; but such regulations must be followed as will maintain the growth of the forests intact.

One of the most important works carried on by the forest service has been the prevention of forest fires. It is estimated that since the settlement of the United States more timber has been destroyed by fire than by the ax, and the annual loss by forest fires exceeds \$50,000,000. These fires are caused by accident, by carelessness in setting fires, by railways and by malicious burning, for the purpose of obtaining land for other uses. Many of these fires could easily have been prevented if they had received early attention from those living near where they originated. The forest service is creating a national and local public sentiment in favor of protecting forests from fire.

Other means of preserving the forests are to prevent the improper cutting of trees for lumber, wastefulness in the method of preparation and use of the trees already cut; to re-forest the districts that have been denuded, by the planting of new trees or by protecting young growths; to assist both the state governments and private

## Forests

individuals in protecting and developing forests under their care. Several agricultural experiment stations, particularly those connected with the university of Minnesota, the Agricultural College of Michigan and with Yale and Harvard, have established courses in forestry. These schools are training experts, who expect to devote their lives to the work of forestry, and their services are in constant demand. See **FORESTS; LUMBER.**

**For'ests**, tracts of land covered with trees, though the term may be applied to a large tract of mingled woodland and open, uncultivated land. In England it is also applied to tracts of land reserved for game. The kinds of trees most numerous in any particular forest depend upon the temperature, the amount of moisture and the nature of the soil. In the forests of the cold temperate climates cone-bearing trees, such as pine, spruce and hemlock, are the most numerous. These are usually interspersed with beech, maple, birch and other hard woods. In the warm temperate climate deciduous trees, such as the oak, prevail, while the forests of the tropical regions are characterized by numerous species of palms. Mingling with these are found mahogany, teak and climbing plants of gigantic size. Each continent has extensive forests. In Europe, Russia, Germany, Switzerland and Austria have the largest area of woodland. In Asia, the densest forests are found in India, on the southern slope of the Himalayas. Large forests also occur in Siam and Burma and in the northern portion of the Chinese Empire and Siberia. South America contains the most extensive forests in the world. These are found in the basin of the Amazon. Another forest of nearly equal extent is that in the basin of the Kongo in Africa. In North America there are vast forests in Mexico, in the Central American states, in the Dominion of Canada and in the United States.

**UNITED STATES.** The forest areas of the United States cover a little more than one-third of the entire area of the country, exclusive of Alaska. These forests may be divided into the eastern, western and lake regions. The eastern forest region includes the area covered by the Appalachian mountain system and the Gulf states, extending in some places west of the Mississippi River. In the northern portion of this region and extending as far south as Maryland, white pine is the most abundant and most valuable timber tree. However, in the higher altitudes, spruce, hemlock and fir, commonly

## Forests

known as Canada balsam, are found, and interspersed with these soft woods are maple, beech, birch and a few other hard woods. South of Maryland and continuing through the Gulf states, the yellow or pitch pine is the most abundant. Mingled with this are the cypress, the oak, the ash and a number of other hard-wood trees.

The forests of the lake region surround the Great Lakes and are found both in the United States and in Canada. In the United States they extend from near the Red River of the North, in Minnesota, eastward until they meet the forests of the Appalachian region of Canada. These forests cover large portions of Minnesota, Wisconsin and Michigan and are rich in white pine, the abundance of which has given rise to an extensive lumber industry in these states. Spruce and some varieties of hard wood are also found interspersed with the pine.

The Rocky Mountain forest region extends from the western boundary of the great plains to the Pacific coast and from the Canadian boundary to Mexico. The forests cover the foothills and sides of the mountains as far up as the tree line. They are often separated by wide, treeless regions, some of which are suitable for grazing, while others are barren. Various species of pine are the prevailing trees. On the western slopes of the Sierra Nevada and coast ranges, particularly the latter, the forests become very dense and contain trees of enormous size. The forests in this portion of the region are entirely different from those found in other parts of North America and constitute the immense lumber regions of Washington and Oregon. The redwood, Oregon pine and species of fir and sugar pine are the timber trees most highly valued. Some authorities consider the forests of Oregon and Washington, in proportion to their area, the most valuable in the world.

The mountains and hills of Alaska are covered with a heavy growth of timber, but the trees are smaller than those found in Washington and Oregon. However, they compare favorably in size with those in the forests of the Appalachian region and are suitable for lumber. The Philippine Islands have a forest area exceeding 40,000,000 acres. This is rich in merchantable timber and, with but few unimportant exceptions, the entire region is in possession of the United States and under control of the forest service.

**VALUE OF FORESTS.** Forests furnish fuel and building material, also material for dyes, medicines and a large number of other useful articles. But their greatest value consists in their influence



## Forge

upon the climate of the open country, in or near the regions in which they are located. The thick matting of dead leaves and branches, which covers all forest areas, prevents rapid evaporation and enables the water which the ground receives from rain and melting snow to flow out gradually through springs and rivulets. The moist atmosphere caused by this soil and the exhalation of vapor through the leaves also increases the rainfall of a locality. Forests equalize the flow of water in streams and springs. As long as they remain, this flow is comparatively regular throughout the year, but as soon as they are cut away the rapid evaporation from the soil causes these streams to become dry or nearly so during certain months of the year, while the compactness of the soil, because of its dryness, causes water from heavy rains and snow to run off rapidly into the valleys. Thus, during the spring, and in case of heavy rains in the summer, freshets are common along all streams from whose sources forests have been removed. See FORESTRY; LUMBER.

**Forge**, *forj*, a workshop or other establishment in which iron or other metal is hammered and shaped by the aid of heat. In the ordinary forge the iron is heated in a small fire, through which a blast of air is driven by a bellows and is shaped by the smith on an anvil. Large forges with steam hammers are connected with works where iron and steel are worked in large quantities.

**Forgery**, *for'jur y*, at common law, the fraudulent making or alteration of a writing or instrument, to the prejudice of another man's rights. The punishment of forgery at common law is as for a misdemeanor, by fine, imprisonment and such other corporal punishment as the court in its discretion shall award. Most, and perhaps all, of the states in the Union have passed laws naming certain acts as forgery, and the national Congress has also enacted several on this subject, all providing additional punishment in cases enumerated in the statutes.

**Forget'-me-not**, an annual or perennial herb, common in the United States and in England. Nearly fifty species are known. Its flowers are bright blue with a yellow eye. The dark blue forget-me-not of the Azores is now cultivated in greenhouses and is much esteemed for its brilliancy. An interesting fact is that this plant has the same name in many languages, and that its flowers are the world over a symbol of friendship. The forget-me-not is sometimes called *scorpion grass*.

## Formosa

**Fork**, a tool having prongs and a handle in line with them. Forks are used for lifting objects which cannot be conveniently moved by the hand, such as hay and grain on farms, meat in a boiling pot and brands in a fire. Hay and grain forks have from two to six prongs, fixed to a long wooden handle. Table forks were invented much later than the patterns named above.

**Formal'dehyde**, a compound of oxygen, hydrogen and carbon, obtained by the oxidation of wood alcohol. In other words, formaldehyde is wood alcohol with the hydrogen removed. Pure formaldehyde is never obtained, the chemical process yielding a solution of 35 parts of formaldehyde to 65 parts of water. Formaldehyde solutions, often under the name of *formalin*, are used as disinfectants and in the manufacture of certain dyes and other chemicals.

**Formic Acid**, an acid so named because it was first obtained from the bodies of ants (Latin *formica*) by steeping them in boiling water. The same acid is contained in human sweat, in the common nettle and in other plants and may be prepared artificially in various ways. It is a colorless, volatile liquid, with pungent odor.

**Formo'sa**, an island in the Chinese Sea, belonging to Japan, and separated from the Chinese province of Fukien by a strait about 80



FORGET-ME-NOT

miles wide at its narrowest point. The island is about 250 miles in length and 70 miles in average breadth. It is divided by a central range of mountains, with peaks from 7000 to 15,000 feet high, into a western and eastern part, the former

## Forms of Address

of which is occupied by Chinese and is highly cultivated, producing in abundance corn, rice, sugar, pepper, camphor, oranges and bananas. The eastern part is inhabited mainly by wild tribes of the Malayan race, who are gradually disappearing before the Chinese. Four ports have been open to European commerce since 1858, namely, Tainan, the capital, Tamsui, Kelung and Takow. The trade of the island since then has greatly increased. The chief exports are coal, tea, camphor, sugar, indigo, hemp and timber; the imports are cotton and woolen goods and opium. The Dutch exercised power over part of Formosa in the seventeenth century. It was ceded to Japan by China in 1895 at the close of the China-Japanese War. Population in 1912, 3,443,679.

**Forms of Address'.** See ADDRESS, FORMS OF.

**For'rest, EDWIN** (1806-1872), an American actor, born in Philadelphia. He showed an early talent for the stage and in 1820 made his debut at Philadelphia, as the hero in Home's play of *Douglas*. In 1826 he appeared before the New York public as Othello, with signal success. In 1836 he visited England, and he later made a second and a third visit. He continued with great success at New York till 1871, when he retired. His chief characters were Othello, Lear, Coriolanus and Richard III.

**Forrest, NATHAN BEDFORD** (1821-1877), an American soldier, born at Chapel Hill, Tenn. At the outbreak of the Civil War he enlisted in the Confederate service, raised a regiment of cavalry and was put in command of the Confederate forces at Fort Donelson. He took an active part in the Battle of Shiloh, where he was wounded. On July 13, 1862, he made an attack upon Murfreesboro and captured the city, and soon afterwards he was commissioned brigadier general. In 1864 he captured Fort Pillow, which was held by about five hundred Federals under Major Booth. Forrest's first assault was unsuccessful, but Booth was killed, and Bradford took command. Forrest sent in a flag of truce, demanding a surrender, and when this was refused he made a second assault and gained an entrance. Nearly the whole garrison was killed, and this won for Forrest an unfavorable reputation. See FORT PILLOW.

**For'ster, JOHN** (1812-1896), an English politician and historical writer. He succeeded Dickens in 1846 as editor of the *Daily News*, and in the next year he became editor of the *Examiner*. Among his works are *Lives of the Statesmen of*

## Fort Fisher

*the Commonwealth; Sir John Eliot: A Biography; The Life and Adventures of Oliver Goldsmith; Walter Savage Landor, and The Life of Charles Dickens.*

**Fort.** See FORTIFICATIONS.

**Fort Dear'born**, a fort built on the site of the present city of Chicago in 1804 (See CHICAGO, subhead *History*). It was the scene of a massacre on August 15, 1812, when the garrison of 67 men and some thirty settlers evacuated the fort under orders from General William Hull. They were attacked in ambush by a force of 500 indians, assisted by others who had promised to escort them to safety, and fully two-thirds of the party were killed. The fort was destroyed on the following day by the indians, was rebuilt in 1816 and was demolished in 1856. The story of this massacre is told without historical accuracy in Randall Parrish's novel, *When Wilderness was King*.

**Fort Dodge**, IOWA, the county-seat of Webster co., 87 mi. n. w. of Des Moines, on the Des Moines River and on the Illinois Central, Chicago Great Western and other railroads. Extensive deposits of gypsum are found here and the city has the largest gypsum mill in the world. Other manufactures include brick, tile, sewer pipe, stoneware, office fixtures, automobiles, carriages, clothing, brooms and pumps. Population in 1910, 15,543.

**Fort Don'elson.** See FORT HENRY AND FORT DONELSON.

**Fort Duquesne, du kane'**, a fort erected by the French in 1754, at the junction of the Allegheny and Monongahela rivers in Pennsylvania. It became at once the center of French military authority in the region drained by the Ohio River and its tributaries. It was for the purpose of reducing this fort that the ill-fated expedition under General Braddock set out in 1755 (See BRADDOCK, EDWARD). Another English expedition of 800 men, for the same purpose, was almost destroyed in October, 1757, and the fort was finally captured in September, 1758. The name of the fort was changed to Fort Pitt, in honor of the great English statesman.

**Fort Fisher**, an earthwork thrown up by the Confederates on the peninsula between the Atlantic Ocean and the Cape Fear River, at the entrance to the port of Wilmington, N. C. This port was one of the last to be held by the Confederates, but fell on January 5, 1865. The fort was bombarded by a fleet under Admiral Porter late in December, 1864, and it was at this time that the famous episode of the explosion of the



## Forth

powder boat *Louisiana* took place. A force was landed under General Butler, but did not accomplish the capture of the fortress and was compelled to reëmbark. Another force under General Terry was landed in January, 1865, and after a continuous bombardment of more than three days the fort was captured with two thousand prisoners and more than 150 guns. The Confederates thereupon destroyed the remaining fortifications about Wilmington and evacuated the town.

**Forth**, an estuary of Scotland. The river is formed in Perthshire by the junction of two streams, the Duehray and the Dhu, about 1 mi. w. of Aberfoyle. From Aberfoyle the river flows southeasterly, forming for a considerable part of its course the boundary between the counties of Stirling and Perth, winding in its lower course in a series of curves, known as the Links of Forth, and expanding thereafter into the Firth of Forth, which forms the most important harbor or refuge north of the Humber. The Firth is 50 miles long and 15 miles across. At Queensferry a great cantilever bridge, 8295 feet long, crosses the Firth.

**Forth Bridge**, a railway bridge across the Firth of Forth, in Scotland. It is of the cantilever type (See **BRIDGE**, subhead *Cantilever Bridges*) and on account of the length of its spans is one of the most remarkable bridges in the world. It has two short arms of 680 feet each, two main spans of 1710 feet each, fifteen spans of 168 feet each and seven small arches. The total length is 8295 feet, or one and a half miles, one mile of which is covered by the cantilevers. The highest point is 361 feet, and the center of the bridge is 152 feet above high water. This bridge was completed in 1889 at a cost of \$13,000,000.

**Fort Henry and Fort Donelson**, two forts in Tennessee, near the Kentucky border, the first situated on the right bank of the Tennessee River and the second on the left bank of the Cumberland River. They were erected by the Confederates in 1861 and were important posts, controlling, as they did, the entrance to avenues of approach to the Central and Southern states. February 6, 1862, General Grant and a land force, assisted by Commodore Foote's river fleet, compelled the surrender of Fort Henry. Most of the garrison, however, escaped to Fort Donelson. Grant advanced upon the latter on the twelfth, and began a vigorous bombardment on the fifteenth, supported on the following day by a bombardment of the fleet. In the night Gen-

## Fortification

erals Floyd, Pillow and Forrest, with about two thousand men, escaped, leaving Buckner in command. On the following morning, Buckner proposed an armistice and requested the terms of surrender. To this Grant made his famous reply, "No terms except unconditional and immediate surrender can be accepted. I propose to move immediately upon your works." Buckner at once surrendered fully fifteen thousand men and a large quantity of ammunition.

**Fortification**, the science of strengthening positions in such a way that they may be defended by a body of men much inferior in number to those by whom they are attacked; and more particularly, the science of strengthening positions so that they may be held against the assault of troops supported by artillery. Fortifications are usually classed as permanent or temporary. *Permanent* fortifications are works required to remain effective for a considerable time, for the purpose of defending important positions and cities, dockyards or arsenals. *Temporary* fortifications are such as are designed merely to throw temporary obstacles in the way of the enemy. Modern scientific fortification had its beginnings in the work of the great French engineer Vauban, who worked under the direction of Louis XIV.

*Permanent fortifications* are constructed on the principle that each part must support and must be supported by some other part; that the works must protect the defenders from the enemy's fire as well as possible, and that the fire of the fortress must completely sweep all parts of the ground in front of the fortified lines. Some idea of permanent fortifications may be obtained from the following description: Around the place to be defended is raised a mound, or bank of earth, called a *rampart*, on the upper surface of which the troops and cannon are placed. This surface is protected from the enemy's fire by a breastwork, or *parapet*, about 8 feet high, sometimes pierced at certain intervals with *embrasures*, through which the guns are fired. Beyond the rampart is the *ditch*, usually about 12 feet in depth, but varying greatly in width. Sometimes this ditch is filled with water, but in other cases it is dry. The outer wall of the ditch is called the *counterscarp*; the inner wall, the *scarp*. From the top of the counterscarp the embankment slopes outward and forms the *glacis*. The slope of the glacis is so constructed as to bring the assailants into direct line of fire from the artillery on the ramparts. Often at certain intervals there are *bastions*, or projecting works,

## Fort Madison

at such angles that their fire will command the straight portion of the fortified line between them. A single fort, such as has been described, is not now considered sufficient defense, on account, mainly, of the long range and high proficiency of modern cannon; hence, it is customary to surround the place with a line or with lines of detached forts at some distance away. Fortifications intended to ward off attacks by sea are now commonly protected on the sea face by plates of iron or steel.

*Temporary, or field, fortifications* vary much, according to the time allowed for construction and the length of time during which they may prove useful. Among works of this nature are the *redan*, which consists of two parapets, with a ditch in front, forming an angle facing the enemy; the *lunette*, which is a redan with short flanks; the *redoubt*, a closed work with a ditch and parapet all around it. As none of these works has a flanking fire in itself, they have to be disposed so that they flank each other within rifle range. To do this effectually, and to strengthen the whole line, the plan generally adopted is to form an entrenched camp by a line of square redoubts, flanking each other, and also a line of simple redans, in front of the intervals of the redoubts. When the time is not sufficient to throw up such works, simple forms of intrenchment, such as shelter trenches, are used to protect troops or oppose the enemy's advance. A very shallow trench, with the earth thrown to the front, so as to afford shelter to one man lying in it, may be made in somewhat less than half an hour; more elaborate forms in about one hour. By placing a man at every four feet, active troops can make good shelter for themselves in an hour. To impede the enemy's advance, an abatis of felled trees may be used, also wire entanglements.

**Fort Madison**, IOWA, the county-seat of Lee co., 18 mi. s. w. of Burlington, on the Mississippi River and on the Atchison, Topeka & Santa Fé and the Chicago, Burlington & Quincy railroads. The city has pork-packing establishments, railroad shops, flour and lumber mills and manufactures of agricultural implements, automobiles, shoes and other articles. Here is the state penitentiary and the Catermole Memorial Library. Fort Madison was settled in 1832, on the site of a fort which had been built in 1808. Population in 1910, 8900.

**Fort Mims**, MASSACRE OF, a massacre perpetrated during the Creek War at Fort Mims, near Mobile, Ala., Aug. 30, 1813. The garrison, including about 550 men, women and children,

## Fort Niagara

was surprised by a greatly superior force of indians under Wethersford, a half-breed. All except 15 were killed.

**Fort Monroe** or **Fortress Monroe**, a military post of the United States, at Old Point Comfort, Elizabeth City County, Va., at the entrance of Hampton Roads. It is on a reservation of about 300 acres and has quarters for 50 officers and 600 men. Jefferson Davis was imprisoned here for two years after the Civil War. See DAVIS, JEFFERSON.

**Fort Moultrie**, *mole'tre*, a fort on Sullivan's Island, at the entrance to the harbor of Charleston, S. C. Early in the Revolutionary War, a force of British regulars under Sir Henry Clinton and a fleet under Sir Peter Parker proceeded to Charleston with the view of using the city as a base of operations for the isolation of the southern colonies. Upon arrival they were confronted by a force of 6500 Americans, about 450 of whom were under Colonel William Moultrie and were stationed in a fort known as Fort Sullivan, on Sullivan's Island. Parker opened fire upon the fortress, and Clinton took up a position on a neighboring sand bank, with the intention of landing troops when the guns at the fort had been silenced. After a contest of more than ten hours, the British were forced to withdraw and to abandon temporarily the invasion of the south. The name of the fort was later changed to Fort Moultrie. It surrendered to the British, May 7, 1780.

A United States garrison occupied Fort Moultrie at the opening of the Civil War, but on December 26, 1860, Major Anderson removed the troops to Fort Sumter, which was better prepared to withstand a bombardment. The South Carolina militia thereupon took possession of Fort Moultrie and used it in the defense of Charleston.

**Fort Niagara** a fort on the American side of the Niagara River, near its mouth, upon the site of a trading post built by La Salle about 1669. In 1725 a Frenchman, Vaudreuil, built Fort Niagara, which became the most important military station and the greatest trading center in America. It was attacked during the French and Indian War by a British expedition, under Governor Shirley of Massachusetts, and was captured by another expedition in 1759. It was the center of British influence among the indians during the Revolution, and many expeditions against the frontier were directed from this point. It was evacuated by the British in August, 1796, and was immediately occupied by



## Fort Pillow

the Americans. During the War of 1812 it was bombarded and was captured by the British December 19, 1813, but was again surrendered after the close of the war. The United States garrison was withdrawn in May, 1826.

**Fort Pillow**, a fort on the east shore of the Mississippi River, in Tennessee, about 40 mi. n. of Memphis. It was constructed by the Confederates under General Pillow in the spring of 1862, but was abandoned in May and was occupied by the Federals in June. In April, 1864, it was attacked by a strong Confederate force under General N. B. Forrest, a famous cavalry leader. The garrison, which was comparatively weak, fought stubbornly for many hours, but was finally overpowered and practically annihilated. The charge has been made that the Confederates deliberately murdered Federals after the surrender, but this was denied by General Forrest and his officers, who claimed that the fearful slaughter was due to the reckless efforts of the Federals to resist capture.

**Fortress Monroe.** See FORT MONROE.

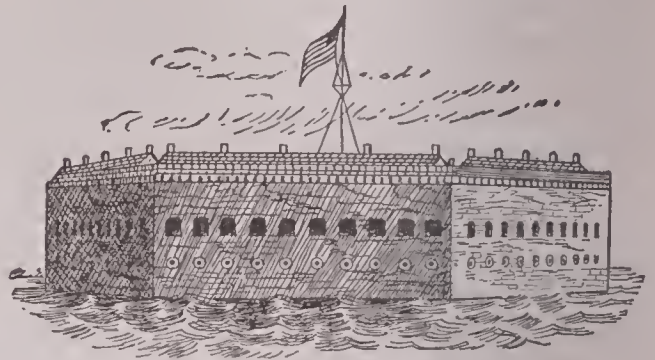
**Fort Scott, KAN.,** the county-seat of Bourbon co., 100 mi. s. of Kansas City, on the Marmaton River and on the Missouri Pacific, the Missouri, Kansas & Texas and other railroads. The city has foundries, machine shops, flour mills and grain elevators and is in a region having deposits of coal, flagstone, cement rocks, mineral paints, zinc and lead. It supports a public library and Mercy Hospital and is the seat of the Kansas normal college and an academy for girls. Population in 1910, 10,463.

**Fort Smith, ARK.,** one of the county-seats of Sebastian co., at the junction of the Arkansas and Poteau rivers, on the Saint Louis & San Francisco, the Missouri Pacific and other railroads. The city has sawmills and cottonseed-oil mills and extensive manufactures of furniture. It does a large wholesale business in groceries, meats and household goods and has a large trade in coal, corn, cotton, lumber, live stock and hides. Fort Smith was settled in 1838 and was chartered as a city of the first class in 1886. Population in 1910, 23,975.

**Fort Sumter** (named after Thomas Sumter, a partisan leader in the Revolutionary War), a fort at the entrance to Charlestown Harbor, S. C. When South Carolina seceded in December, 1860, Major Anderson, who commanded the defenses in the harbor, abandoned the other forts and occupied Fort Sumter, with a garrison of eighty men. On April 12, 1861, after prolonged negotiations between Anderson, the

## Fort Wayne

South Carolina authorities and the government at Washington, General Beauregard opened fire on the fort, which surrendered on the 14th of the same month. This was the beginning of the Civil War. The Confederates greatly strengthened the fort, and it resisted several attacks, but was evacuated in February, 1863. On



FORT SUMTER—BEFORE THE CIVIL WAR

April 14, 1865, Major (then General) Anderson raised the same United States flag over the fort that he had lowered exactly four years before. It has been rebuilt on a modified plan.

**Fortu'na**, the Roman goddess of chance, called by the Greeks *Tyche*. She was generally



FORTUNA

represented with a rudder, the sign of her guiding power; or, later, sitting or standing on a wheel or globe, with a bandage over her eyes and a scepter in her hand.

**Fort Wayne, IND.,** the county-seat of Allen co., 95 mi. s. w. of Toledo, Ohio, at the junction

of the Saint Mary's and Saint Joseph's rivers, where they form the Maumee, and on the Lake Shore & Michigan Southern, the Wabash, the Pennsylvania, the Grand Rapids & Indiana and other railroads. It is one of the most important railroad centers in the state. The city is in an agricultural district and has railroad shops, flour mills and bakeries, foundries, packing houses, lumber mills and other factories. The largest mill in the world devoted exclusively to the manufacture of hosiery is here. Fort Wayne is on the site of the principal village of the Miami Indians and is near the location of the old French Fort Miami. About 1794 General Anthony Wayne built another fort here, and a village gradually grew up around it. It was chartered as a city in 1839, but developed very slowly until after the construction of the Wabash and Erie Canal and several railroads in the decade following 1850. The United States census of 1910 established the geographical center of manufactures at a point ten miles west of Fort Wayne. Population in 1910, 63,933.

**Fort William**, a city of Ontario, Canada, situated at the head of Lake Superior and on the Grand Trunk Pacific, Canadian Pacific and Canadian Northern railways. It is one of the largest trade centers of Canada, is a distributing and shipping point for the grain areas of the west, and is a leading manufacturer of flour, brick, tinware, furniture, lumber and other commodities. Population in 1911, 16,499.

**Fort Worth, Tex.**, the county-seat of Tarrant co., 30 mi. w. of Dallas, on the Trinity River and on the Chicago, Rock Island & Pacific, the Texas & Pacific, the Fort Worth & Denver and other railroads. The city is in a vast stock-raising country and is an important cotton market. The principal industries include packing houses, flour mills, tanneries, breweries, railroad shops, foundries, cotton mills and other factories. It is the seat of Fort Worth University, Polytechnic College, Saint Ignatius Academy, Fort Worth Medical College, an academy of music and two business colleges. Fort Worth was settled in 1849 and was incorporated in 1872. Population in 1910, 73,312.

**For'um**, among the Romans, any open place where the markets and courts of justice were held. There were a number of such places in Rome, the most celebrated, by far, being the great Roman Forum, between Mount Palatine and the Capitoline Hill, which formed the political and commercial center of the city. Surrounding this were the temples of Saturn and of

Concord, the Basilica Porcia, the first courthouse, built in 184 B. C., and many other beautiful buildings. Though this Forum escaped the devastations of the fifth century, it became almost a waste in the Middle Ages, but of late years the government has made clearances and excavations and has taken charge of the valuable relics which are left. In legal phrase, *forum* signifies the court or place where an action is instituted.

**Fossil**, the name of petrified forms of plants and animals, found in the rock formations of the earth. Most of the fossils are of species that have long since been extinct, and their study is of the greatest importance to the geologist, since they reveal to him the forms and conditions of life at different periods in the world's history. From the study of fossils it is pretty definitely determined that plant life existed before animal life, and in all cases the simplest forms of life are those which first appeared. These consist of the very lowest orders, such as seaweeds and rushes, among plants, and the simplest mollusks, among animals.

From these simple forms both vegetable and animal life increased in complexity and importance as conditions for the existence of higher orders appeared. The animal fossils are more easily traced than the plant fossils. A study of these shows that no vertebrate animals appeared before the Silurian period, and during the latter part of this and the Devonian period the fishes reached their highest development. These were followed by the reptiles, which in turn were followed by birds, and these by the mammals, which were the progenitors of existing species. The study of fossils also shows that each period in the world's history has been characterized by some special form of life, which at that time reached its highest development; thus, the fishes distinguish the Devonian age, and the reptiles, the age that followed. A study of the fossils of plants shows the same progress from the simplest forms to existing species. See GEOLOGY; PALEONTOLOGY.

**Foster**, JOHN WATSON (1836- ), an American statesman and diplomat, born in Indiana and educated at the University of Indiana. He was admitted to the bar, served in the Union army, entered journalism and was minister to Mexico (1873-1880). Thereafter he represented the United States on various special diplomatic missions and became secretary of state in 1892. He represented the United States at Paris at the Bering Sea court of arbitration in 1893; par-



ticipated in negotiations for peace between China and Japan in 1895, by invitation of the emperor of China, and was agent of the United States before the Alaskan Boundary Commission. He is the author of *A Century of American Diplomacy* and *American Diplomacy in the Orient*.

**Foster**, MURPHY JAMES (1849- ), an American politician, born at Franklin, La. He studied at Washington and Lee University, graduated at Cumberland University and from the law department of Tulane University. He engaged in practice in his native town, was elected to the state senate in 1880 and served for twelve years, winning special distinction as a tireless opponent of the state lottery. From 1892 to 1900 he was governor of the state, in the latter year was elected United States senator and was reelected in 1906.

**Foster**, STEPHEN COLLINS (1826-1864), a song writer, born near Pittsburg, Pa. Without any formal training in music, Foster composed more than one hundred seventy-five songs, usually both words and music. For *The Old Folks at Home* (*The Swanee River*), he is said to have received only five hundred dollars. The most popular of his other songs are *My Old Kentucky Home*, *Nellie Was a Lady* and *Massa's in the Cold, Cold Ground*.

**Fosto'ria**, OHIO, a city in Seneca and Hancock counties, 35 mi. s. e. of Toledo, on the Baltimore & Ohio, the Lake Erie & Western and several other railroads. It has flour and planing mills, brass and iron works and manufactures of glass, carriages, electro-carbons and other articles. It is in a fertile farming region and is near the oil fields. Population in 1910, 9597.

**Foucault**, *foo ko'*, JEAN BERNARD LEON (1819-1868), a French physicist. His name is especially connected with a celebrated pendulum experiment, employed as a method of showing the rotation of the earth on its axis. He also made important discoveries in optics, electric lighting and photography and invented the gyroscope and the polarizing prism known by his name.

**Fouche**, *foo sha'*, JOSEPH, Duke of Otranto (1754-1820), a French politician. Soon after the outbreak of the French Revolution he identified himself with the more radical party, was elected to the national convention and took a part in the trial and execution of Louis XVI. As commissioner at Lyons he was guilty of the most extreme cruelty. After holding several other offices, he was made in 1799 minister of police,

and this office he continued to hold after Bonaparte was made consul. He seems during this later period to have been more moderate in his methods than in the early stage of the Revolution. When Napoleon became emperor he made Fouché minister of the interior and head of the police force, but both of these offices he lost by carrying out a policy of which Napoleon did not approve. Finally Napoleon became so incensed against him that Fouché was obliged to flee from France, and he returned after the Bourbon restoration. When Napoleon returned from Elba, Fouché, although he was at heart in favor of the Bourbons, threw in his lot with Napoleon. After the second restoration he served for a time as minister of police, but was banished from the country by the law against the regicides.

**Foulke**, *fohlk*, WILLIAM DUDLEY (1848- ), an American lawyer, reformer and writer, born in New York City, educated at Columbia University and admitted to the bar in New York in 1870. Six years later he removed to Richmond, Ind., where he practiced successfully until 1890, when he retired from the practice of law. He was elected to the state senate and became a champion of the civil service reform movement in Indiana, as well as an important figure in the national movement. He wrote many articles for the leading periodicals upon his favorite theme, besides valuable studies of contemporary politics.

**Founding**, the art of casting iron, steel, brass and some other metals into various shapes. The place where castings are made is called the *foundry*. The process of making iron castings practically illustrates that of all other metals. A pattern of the article is first made of wood. This is a little larger than the object, to allow for shrinkage, and is so constructed that it can be taken from the mold in parts, if necessary. The mold is usually a box in two parts. The pattern is set in one part, and molding sand, which is a sand of very fine grain, is tightly packed around it. The other part of the mold is then added, and the process of packing the pattern is completed. When this is done, the mold can be opened and the pattern removed without disturbing the sand, thus leaving a perfect mold of the article to be cast. Holes for pouring in the metal are cut through the sand. The iron is melted in a furnace, called a *cupola*, which is a cylindrical iron furnace, lined with fire brick. It has tuyeres near the bottom, through which the blast enters (See BLAST FURNACE). The melted iron is poured into

ladles, from which it is poured directly into the molds. Complicated castings require patterns in several parts and call for great skill in molding. See BELL; BRASS; IRON; STEEL.

**Foundling Hos'pitals**, institutions for receiving children abandoned by their parents and found by strangers. Among the first of such institutions were those of Paris, instituted in 1670, and London, in 1739. The latter was originally a hospital for all exposed children; but the enormous increase in abandonments caused the hospital to be changed in 1760 to one for poor, illegitimate children, whose mothers are known. In the United States foundling hospitals exist in most large cities, but are carefully regulated by law to prevent abuse of any sort. The death rate in foundling asylums has always been very high, and in many cities a great improvement in this is noticed where the infants can be put out to board in good private families. In Massachusetts, foundling hospitals are prohibited by law.

**Fount** or **Font**. See TYPE.

**Fountain**, a natural spring or stream, or an ornamental basin or tank for receiving water, from which it may be taken for use or may be thrown upward in jets. In the ordinary use of the term its meaning is restricted to artificial fountains. The necessary parts of a fountain are a receptacle for the water and some device for supplying the stream. If the fountain is to be in the form of a jet, the water must flow through a pipe, under pressure. This pressure may be supplied from a head much higher than the fountain or by means of pumps. In fountains that play continuously the pressure is usually supplied by having the source much higher than the fountain, since this reduces the expense of operation.

Fountains are of very ancient date, and both the Greeks and the Romans gave much attention to them, as is shown by the numerous remains of fountains in all ancient Mediterranean countries. The fountains of the Greeks combined ornament and utility, and in some of them the water flowed from the mouth of an animal, usually a lion or a boar, or from the hoofs of the horse Pegasus. The pool or reservoir was usually sunken and was reached by descending a flight of steps. The fountains of the Romans were designed to ornament public parks and squares and at the same time to supply water to those who could not afford to bring it to their dwellings. Modern fountains are patterned after those of the Greeks and Romans and are found

in many cities and towns of Europe and America. Italy, France and Spain are especially noted for the number and beauty of these structures. Among the most famous of those in Europe are the Schöne Brunnen, at Nuremberg, Germany; the Fontana Maggiore, at Perugia, Italy; the Fontaine des Innocents, in Paris, and the fountains and cascades at Versailles and Saint Cloud, in France, and the Alameda Fountain, at Malaga, Spain. Some of the most famous fountains of recent date have been constructed for great expositions. Among these are the *Fountain of the Republic*, by Macmonnies, at the World's Columbian Exposition in Chicago in 1893; the fountains of *Man, Nature and Progress*, at the Pan-American Exposition in Buffalo in 1901, and the *Cascades*, at the Louisiana Purchase Exposition at Saint Louis in 1904.

Electric fountains are constructed to play for only brief periods at a time and are so arranged that a strong electric light can be thrown through the jets. By passing this light through glass of different colors, many variegated and beautiful effects can be produced.

**Fountain of Youth**. It has been the belief of many people in many times that somewhere there existed a fountain that would bring back youth to the aged. It was the search for this miraculous fountain that brought Ponce de Leon and his followers and possibly other Spanish explorers to America.

**Fouque**, *joo kay'*, FRIEDRICH HEINRICH KARL, Baron de la Motte (1777-1843), a German poet and novelist. His work is marked by fantastic unreality and extravagance of conception. Several of his tales, *The Enchanted Ring*, *Aslauga's Knight* and, especially, *Undine*, have been very popular.

**Fouquet**, *joo kay'*, NICOLAS, Vicomte de Melun and de Vaux, Marquis de Belle-Isle (1615-1680), a famous French financier, born in Paris of noble parents. He was educated for the civil service and held important offices under the government, where he attained the favor of Mazarin, then at the height of his political power. In 1653 he became superintendent of finance and immediately instituted reforms in administration which placed the government upon a comparatively firm financial footing. He became a rival of Mazarin and also came into ill favor with Colbert somewhat later. In September, 1661, he was arrested, was held in prison for three years and finally was condemned to banishment with confiscation of all property. His sentence was changed to imprisonment for life. During

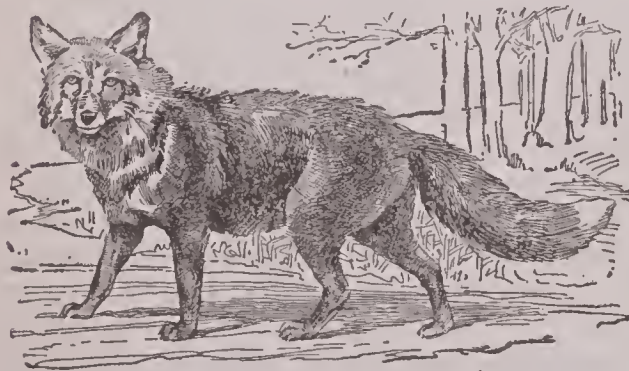


fifteen years' captivity he wrote several religious works.

**Fourier**, *joo rya'*, FRANÇOIS MARIE CHARLES (1772-1837), a French socialist, founder of the system named after him. He entered into business on his own account at Lyons, but lost all his money during the early years of the French Revolution and was forced to enlist in the revolutionary army. Discharged in 1795 on account of ill health, he returned to commerce, filling subordinate situations. He wrote his books in his leisure hours and published them out of his scanty savings.

**Fowl**, a word originally synonymous with *bird*, now used in a stricter sense to designate a family of birds of which the common domestic fowls, the cock and hen, are familiar examples. The general form and characters of the bill and feet agree with those of the pheasants, but the crown of the head is generally naked and is furnished with a fleshy comb; the base of the lower mandibles also bears fleshy lobes, or wattles, which are most conspicuous in the males. The legs of the male are furnished with spurs, which are much used in conflict, the cocks being particularly quarrelsome and unable to suffer the presence of a rival. In the center of the cock's tail are two long feathers, which fall backward in a graceful arch and add great beauty to the whole aspect of the fowl. Except in the pure white breeds, the plumage of the cock is always more splendid than that of the hen. All the species are natives of the East Indies and the Malay Archipelago. See POULTRY.

**Fox**, an animal closely related to the dog. It is a native of almost every part of the globe and



RED FOX

is everywhere known as the most wily of beasts of prey. It has a straight, bushy tail, erect ears and is extremely alert and avaricious, devouring birds and small quadrupeds, fruits, honey and eggs. The stories told of the animal's intelligence in eluding its enemies, in protecting its

young and in getting its food are often too wonderful to be easily believed. The fox's home is a dry burrow or hole in the rock, and usually consists of an outer hole, or room, where the fox lies, a store room, where he keeps his food, and behind all, his sleeping room and the place where his family lives. When the fox is captured he will sometimes feign death and will endure the roughest treatment without flinching.

Besides the common fox of Europe and Asia, there are the *blue fox* of the Aleutian and other Arctic islands, notable for its beautiful bluish fur, one of the most valuable furs in the market; the *black fox*, a native of the northern parts of Asia and America, similar to the common fox, but distinguishable by its rich, shiny, black fur; the *gray fox*, common through the northern parts of America, characterized by the thick tail, at the tip of which is a tuft of stiff hairs; the *red fox*, of America, generally of a pale yellow color, but in the winter almost pure white, especially in the Arctic regions; the *crossed fox*, whose fur is gray on the upper parts and black beneath and on the muzzle, with a dark cross over the shoulders, and the *swift fox*, an inhabitant of the western American plain. In England, fox-hunting is one of the greatest of sports, and large packs of hounds and many fine horses are trained for the hunt. The fox will dodge, double on his track, try to conceal his scent and use many other ingenious tricks to deceive his pursuers. This sport is not regarded with favor in America, because it is considered excessively cruel and because land owners object to opening their fields for such sports.

**Fox** or **Muskwaki**, a tribe of indians belonging to the Algonquian family, now few in numbers and scattered over Oklahoma, Iowa, Kansas and Nebraska. See SAC.

**Fox**, CHARLES JAMES (1749-1806), an eminent English statesman and orator. From his first election to Parliament in 1768 he was recognized as a man of promise. He was a member of North's ministry from 1770 to 1773 and of Rockingham's in 1782. He was a close friend of Burke and was one of the chief opponents of the war with America, the outcome of which he clearly foresaw. As an admirer of Napoleon and an opponent of the war with France, Fox was the great rival of Pitt. Among orators, Fox was of the first class, although in eloquence and brilliancy he did not perhaps equal Pitt, Burke and Sheridan. His private life was marred by vices, but these he never allowed to interfere with the performance of his public duties.

## Fox

**Fox, GEORGE** (1624–1691), the founder of the Society of Friends, or Quakers, was born at Drayton, in Leicestershire. He was apprenticed to a shoemaker, but he soon began to wander from place to place, preaching and otherwise laboring for religious reforms. He declared that the source of divine truth was not the Scriptures, but the Spirit of God; for these words he was frequently imprisoned, but still he gained many followers. He traveled in the West Indies and on the continent of Europe and won many converts. His followers were first denominated *Quakers* in consequence of their trembling mode of delivery and their calls on the magistracy to tremble before the Lord.

**Fox Bat**, the name of the largest of the bat family, sometimes attaining a length of from four to five feet. It is a fruit-eating bat, found in Japan, China, Australia, Java, Sumatra, Borneo and parts of Africa. Fox bats receive their name because of the resemblance of their muzzles to those of the fox. They are also called *flying foxes*. They have soft, woolly fur, of a reddish color. The natives consider this bat a good article of food, but it often does serious damage to their fruit plantations. The fox bat is nocturnal in its habits.

**Foxe, JOHN** (1516–1587), an English Church historian. His principal work is the *History of the Acts and Monuments of the Church*, commonly called *Foxe's Book of Martyrs*, which has gone through innumerable editions.

**Fox'glove**, a plant which grows on banks and in pastures, in hilly and rocky countries in Europe, Asia and the Canary Islands. It is stately and beautiful and has a great reputation



FOXHOUND

as a medicinal plant. Digitalis, as the drug prepared from the foxglove is known, is a bitter substance that has power over the action of the heart and may prove fatal in large doses. The

## Fox Terrier

purple, or sometimes white, tubular flowers are large and showy and are arranged in a long, loose spike at the end of the stem.

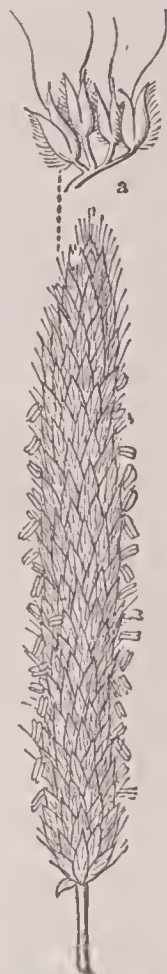
**Fox'hound**, a high-spirited hound that has a keen scent, remarkable perseverance and great endurance. It is easily trained and becomes very skilful in hunting foxes. Somewhat smaller than the staghound, the foxhound seems to be a cross between the staghound or the bloodhound and the greyhound. It is commonly of a white color, with patches of black and tan, has short hair, large and straight limbs and large, thin ears. Its usual height is about twenty inches.

**Fox River**, a river of Wisconsin, which enters Green Bay, an arm of Lake Michigan, after passing through Lake Winnebago. It is connected by canal with the Mississippi and thus furnishes water communication between that river and the Atlantic. Its length is about 250 miles.

**Fox Spar'row**, a rusty red sparrow with a whitish breast, marked with rust-red. This bird, which is one of the largest and handsomest of the sparrows, appears in the Northern states during the spring migrations. It has a beautiful song, much like that of the thrush.

**Fox'tail Grass**, the common name given to certain grasses, because of the shape of the large clusters in which the flowers are arranged. It is an abundant natural grass in meadows and pastures and is an excellent fodder plant. Other species, however, are dry and harsh, not only valueless, but sometimes troublesome weeds, especially in clover fields.

**Fox Ter'rier**, a small dog with long, flat and rather narrow head, strong jaws and small V-shaped ears. The nose is black, the eyes small and the body strong. The color is usually white, with black or tan markings. The fox terrier was formerly used to drive foxes



FOXTAIL GRASS  
a, spikelet in bloom.



FOX TERRIER



from their holes, but is now regarded chiefly as a pet.

**Foyle**, a river of Ireland, which flows north-east through Tyrone, Donegal and Londonderry, till it falls into Lough Foyle, 4 miles below the city of Londonderry.

**Fraction**, in arithmetic and algebra, one or more of several equal parts into which a whole number is divided; also the written expression of this quantity. A written fraction has two terms, the *denominator*, which tells the number of parts into which the whole number is divided, and the *numerator*, which indicates the number of those parts that are considered. When the denominator is greater than the numerator the fraction is *proper*; when less, it is *improper* and then always represents more than one. When denominator and numerator are equal, the fraction represents *unity*, or one. Fractions are of two classes, *common*, or *vulgar*, and *decimal*. In the former the denominator is written below the numerator, from which it is separated by a line, as,  $\frac{2}{3}$ . In the latter, the denominator always equals 10 or a power of 10. It may be written below the numerator or in a shorter form, as, .01 (equals  $\frac{1}{100}$ ), the denominator being determined by the position of the numerator in relation to a fixed point, called the decimal point. Fractions can be added and subtracted when they are *similar*, that is, when their denominators are the same, by adding the numerators. They can be made similar by finding the least common multiple of their denominators and multiplying each numerator by the quotient resulting from the division of the new denominator by the old. Common fractions can be multiplied by multiplying the numerators together and the denominators together, the product of the numerators becoming the numerator of a new fraction and the product of the denominators becoming the denominator. In dividing one common fraction by another, the divisor is inverted and the process is completed as in multiplication. One decimal fraction may be multiplied by another in the same manner as whole numbers, but in the product a decimal point is placed as many places to the left of the right-hand figure as the sum of the decimal places in the multiplicand and the multiplier. A decimal fraction may be divided by another in the same manner as in the division of whole numbers, the decimal point in the quotient being placed as many places to the right of the right-hand figure as the difference between the decimal places in the dividend and the divisor. A com-

plex fraction is one in which the numerator or denominator contains a fraction. In algebra, fractions are subject to the same principles and operations as in arithmetic, the disposition of signs being the only added element.

**Fra Diavolo**, *frah de ah'vo lo*, (Italian, "brother devil") (1770?-1806), a famous Italian brigand, born in Calabria. His real name was Michele Pezza. He was originally a monk. Collecting a band of outlaws, he retired to the mountains, where he attacked and robbed travelers, treating them with the greatest cruelty. He assisted Ferdinand of Naples against the French, but was afterwards detected in fomenting rebellion and was seized and executed. Auber's opera *Fra Diavolo* is founded upon the traditions connected with the name of Pezza, but it has little true historical setting. See BRIGANDAGE.

**Fra'mingham**, MASS., a town in Middlesex co., 20 mi. w. of Boston, on the Sudbury River and on the New York, New Haven & Hartford railroad. A state normal school is located here, and the town has a public library, an almshouse, a hospital and a home for the aged. There are manufactures of boots, shoes, chairs and rubber, woolen and other goods. It was settled about 1647 and was known as Danforth's Plantation until its incorporation in 1700. Population in 1910, 12,948.

**Franc**, a modern silver coin and money of account, which since 1795 has formed the unit of the French monetary system and has also been adopted as the unit of coinage by Switzerland and Belgium. Its value is a little over 19 cents in United States money and about 9½ pence in English money. It is divided into 10 *decimes* and 100 *centimes*. One of the most common coins in France is the *sou*, equivalent to 5 centimes. Other coins are the 2-franc, 5-franc, 20-centime and 50-centime pieces, in silver, and the 5-franc, 10-franc, 20-franc (the Napoleon), 50-franc and 100-franc pieces, in gold.

**France**, *frans*, a country in the southwestern part of Europe, extending from latitude 42° 20' to 51° 5' n. and from longitude 4° 48' w. to 8° 11' e. It is bounded on the n. e. by Belgium, on the e. by Germany, Switzerland and Italy, on the s. by the Mediterranean Sea and Spain, on the w. by the Bay of Biscay and Atlantic Ocean and on the n. w. by the English Channel and the Strait of Dover. The important coast waters are the Gulf of Lyons and the Bay of Biscay. The greatest length from north to south is 600 miles, and from east to west, 550 miles. The longest distance through the coun-

try is on a line extending diagonally from Brest to the southeastern corner, 680 miles. The area, exclusive of islands, is 207,054 sq. mi., or about  $1\frac{3}{8}$  the area of Texas. The coast line is very even and is about 2000 miles in extent.

**SURFACE AND DRAINAGE.** The larger part of the country is comparatively low and level. The highest lands are in the south and southeast. The Pyrenees form an unbroken boundary between France and Spain and have an average height of about 9000 feet, but the highest peaks reach an altitude of nearly 10,500 feet. The eastern boundary of the country is formed by the Alps in the south, the Jura Mountains in the center and the Vosges Mountains in the north. The Alps attain their highest altitudes in this boundary line, where Mont Blanc, which is nearly all in France, reaches a height of 15,780 feet. Other important peaks on this range are Mont Cenis, to the south, noted for its celebrated pass, and later for the railway tunnel which forms connection with Italy; Mont Genevre, and Mont Viso. All of these are of sufficient altitude to give them prominence in a range of mountains noted for the grandeur of its scenery. West of the Alps and running almost parallel to them are the Cevennes, a range of low mountains which extends almost from the southern to the northern boundary and forms the great watershed separating the valleys of the Rhine and Rhone from the rivers which flow into the Bay of Biscay and the English Channel. In the south central portion of the country are the Mountains of Auvergne, a series of low volcanic peaks, situated upon the central plateau. All of the northern and western portion of the country is a part of the great Asiatic plain, which finds its western terminus here and in the southern part of Great Britain. The general slope of this plain is to the north and west, and it occupies fully four-fifths of the entire country. The spurs thrown off by the great watershed divide France into seven principal river basins, six of which are on the northwestern slope and one on the southeastern. These are (1) the basin of the Garonne and its affluents; (2) the basin of the Loire and its tributaries, the Nièvre and Maine on the right, the Allier, Loiret, Cher, Indre, Vienne and Sèvre Nantaise on the left; (3) the basin of the Seine and its tributaries, the Aude, Marne and Oise on the right, the Yonne and Eure on the left; (4) the basin of the Meuse, with its affluent, the Sambre; (5) the basin of the Escaut, or Scheldt, with its affluent, the Scarpe; (6) the basin which pours a number

of tributaries, the principal of which is the Moselle, into the Rhine; (7) the basin of the Rhone, occupying the whole of the territory which lies to the southeast of the great watershed, the tributaries being the Ain, Saône, Ardèche and Gard on the right, and the Isère, Drôme and Durance on the left. The four great rivers of France are the Loire, the Seine, the Rhone and the Garonne. France has in all more than 200 navigable streams, with a total navigation of about 5500 miles. Lakes are few and small.

**CLIMATE.** The climate of France is characterized by its mild and even temperature throughout all of the lowland region, and by its continental features in the mountainous regions of the interior. In general along the coast the climate is remarkably warm and even for the latitude. This is due largely to the warm winds blowing over the Atlantic, which prevail during the greater part of the year. The high altitudes in the mountainous regions are cooler, and in the Alpine region the climate exhibits a marked contrast between winter and summer, the winters being cold and the summers hot. The southeastern section, bordering on the Mediterranean, has a semi-tropical climate, and here the olive, the orange and other semi-tropical fruits and plants flourish. The prevailing winds over this portion come from the Mediterranean, and it is due to this fact that this section maintains its high and even temperature. The rainfall varies considerably in different parts of the country. In the mountainous regions of the Pyrenees, the Cevennes and the Alps it usually exceeds 40 inches. Throughout the country as a whole the average is about 30 inches. With the exception of a small area in the northern plains, where the annual rainfall is only about 10 inches, there is everywhere an abundance of moisture for agricultural purposes.

**MINERAL RESOURCES.** Coal fields are numerous, but only two are really of importance, that of Valenciennes, in the northeast, forming the western extremity of the great Belgian coal field, and that of Saint Etienne, in the southeast, to which the manufactures of Lyons and the surrounding districts are indebted for much of their prosperity. However, the annual output falls so far short of the annual consumption that a large import takes place from England and Belgium, particularly the latter, and wood continues to be the common fuel throughout France, at least for domestic purposes. The coal fields contain seams of iron, which are extensively worked and which furnish ore to a



## France

great number of blast furnaces; but of the total amount of ore smelted in the country a considerable proportion is imported. Other metals, such as lead, zinc, manganese and copper, are obtained to some extent. Common salt is obtained from mines of rock salt, from salt springs and in still greater quantity from lagoons and salt marshes on the coast. Marble is quarried in the Alps and Pyrenees, granite and other building stone is found in many localities and roofing slate is obtained in large quantities.

**FISHERIES.** The fisheries of France are extensive. The principal fishes of commercial importance are sardines, found on the coast of the Bay of Biscay; herring, mackerel, turbot and salmon, abundant in the English Channel and the North Sea; tunnies and anchovies, found on the shores of the Mediterranean. Oyster breeding is largely engaged in, the most extensive oyster beds being those of the basin of Arcachon, in the Department of the Gironde. Cod fishing is carried on actively near the Newfoundland banks by French fishermen, and also near Iceland.

**AGRICULTURE.** About nine-tenths of the soil of France is productive, and about one-half of the whole is under the plow. The cereals forming the great bulk of the cultivated crops are wheat, oats, rye and barley. Wheat is the most important cereal, and, next to Russia, France raises the largest quantity of all European countries. The crops next in importance to these are meslin, or mixed corn, potatoes, hemp, rape, maize, buckwheat, flax and beets. Beets are cultivated extensively in some departments, especially in that of Nord, for the manufacture of sugar. The cultivation of tobacco is monopolized by the government and is confined to certain departments. In France grass land is not abundant and the breeding of cattle is indifferently practiced. The rearing of sheep is more successful; much of the wool being scarcely inferior to merino wool. Excellent horses are bred in the north, and as there is an extensive demand for horses for the army, considerable pains is taken in the government studs to improve the breeds. Asses and mules, generally of a superior description, are much employed. The cultivation of the vine is one of the most important branches of French agriculture, the total quantity of land in vineyards being nearly a twenty-fifth of the whole surface. In everything relating to this branch of culture, the French are unsurpassed, the various first-class wines which they produce, under the names of Champagne,

## France

Burgundy and Bordeaux, being universally known. It is estimated that in good years France produces about one-half of the wine of the world. Among the most important fruit trees cultivated in France are the apple, especially in Normandy; the chestnut, whose nuts in some of the central districts of France form a staple of food among the poorer classes; the mulberry tree, cultivated in the southeast, both for its fruit and its leaves, the latter furnishing the food of the silkworms so largely reared here (See **SILK**); the olive, the pear, the plum, the peach, the orange, the citron and the fig. The land is divided into small farms, the largest seldom exceeding fifteen acres. Most of these farms are owned by those who occupy them. Intensive farming is practiced; the utmost skill and latest scientific methods are employed in cultivating the soil, and excellent returns reward the husbandmen.

**MANUFACTURES.** France is the fourth manufacturing country of the world. The most important of the textile manufactures is that of silk goods, having its chief seat at Lyons and the surrounding districts. It employs about two millions of persons and furnishes more than one-fourth in value of the whole of the manufactured products of France. After silk goods, though at a considerable distance, follow cotton stuffs and woollens, made largely at Rheims, Amiens and Beauvais; carpets, at Abbeville; tapestry, at Paris and Beauvais; linens, including fine muslin, gauze and lace, at Saint Quentin; cutlery, porcelain, stoneware and common pottery, beet sugar, leather, paper, hats, hosiery, steel, iron, brass and zinc ware, plate and flint glass, besides many ornamental and artistic articles; jewelry, clocks, surgical instruments, types, engravings, buttons, gloves, ribbons and numerous other small articles.

**TRANSPORTATION.** The canals are numerous. The Canal du Midi, or, as it is sometimes called, the Canal of Languedoc, starting from a point in the Garonne a little below Toulouse, extends to the lagoon of Thau and thereby gives a continuous navigable communication between the Atlantic and the Mediterranean, in the line of the important towns of Bordeaux, Agen, Toulouse, Carcassonne and Narbonne. In like manner three separate canals cut across the basin of the Rhone, the Canal du Centre, or of Charollais, connecting the Saône and the Loire; the Rhone and Rhine Canal, so called because it unites these rivers, partly by the intervention of the Doubs; and the Canal of Bourgogne, connecting

## France

the Saône, the Yonne and the Seine. In all, France possesses about 3000 miles of canals, in addition to about 5500 miles of navigable rivers, giving a total equal to about one mile of internal navigation for every twenty-four square miles of surface. The railways in France partly belong to the State and partly have been granted to private companies for a limited period, at the end of which they become State property. In 1912 there were 31,391 miles of railway in operation, besides 5600 miles of tramway. Paris is the great railway center, and lines radiate from it in all directions. These, with cross lines, give all important towns railway communication. There were also 114,400 miles of telegraph lines.

**COMMERCE.** The foreign trade amounted in 1911 to about \$2,860,000,000. The exports are slightly less than the imports, which consist of food products, raw materials for manufactures and coal, while the exports consist of wine, dairy products, raw silk and manufactured goods, in which textiles, gloves, millinery and small wares are important. The foreign trade is carried on principally with Great Britain, Belgium, the United States and Germany, the countries being named in the order of their importance.

**INHABITANTS AND LANGUAGE.** The French people are the result of the intermingling of numerous races, some of which came from the North and belonged to the Teutonic branch of the human family, while others came from the South and belonged to the Latin branch. The inhabitants of the northwestern part of France exhibit strong Teutonic characteristics. They are tall of stature and have light hair and light complexion, while those of the southern and southwestern portion of the country exhibit equally strong Latin traits. They are usually short of stature, have dark hair and eyes and dark skins. There is no marked line of separation between these two classes, since through intermarriage types having characteristics between the two are frequently formed. The French language prevails throughout the country, but in the north, especially in the departments bordering on Belgium, Flemish is spoken to some extent, while in the south-east Italian is quite common. See **FRENCH LANGUAGE**.

**EDUCATION.** The country has a complete system of education, extending from the kindergarten to the highest university. For a full description, see **EDUCATION, NATIONAL SYSTEMS OF**, subhead *France*.

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**LITERATURE AND ART.** See **LITERATURE**, subhead *French Literature*; **PAINTING**; **SCULPTURE**, subhead *France*; **ARCHITECTURE**.

**COLONIES.** The colonial possessions of France far exceed in area and population the home country and are distributed as shown by the following table:

FRANCE'S COLONIAL POSSESSIONS	AREA* IN ENGLISH MILES	ESTIMATED POPULATION
<b>IN ASIA:</b>		
India.....	196	277,000
Annam.....	52,100	6,000,000
Cambodia.....	37,400	1,500,000
Cochin-China.....	22,000	2,968,600
Tonkin and Laos.....	144,400	6,500,000
<b>IN AFRICA:</b>		
Algeria.....	184,474	5,563,000
Tunis.....	51,000	2,000,000
Western Sahara.....	1,544,000	2,550,000
Senegal.....	806,000	4,523,000
Senegambia and Niger.....	210,000	3,000,000
French Guinea.....	95,000	2,200,000
Ivory Coast.....	116,000	1,000,000
Dahomey.....	60,000	1,000,000
Kongo.....	450,000	10,000,000
Somali Coast and Dependencies.....	12,000	200,000
Réunion.....	966	201,000
Comoro Isles.....	760	90,000
Madagascar and Islands...	227,950	3,054,650
<b>IN AMERICA:</b>		
Guiana.....	30,500	49,009
Guadeloupe and Dependencies.....	688	190,273
Martinique.....	380	182,024
St. Pierre and Miquelon...	92	4,768
<b>IN OCEANIA:</b>		
New Caledonia and Dependencies.....	7,650	55,886
Establishments in Oceania.	1,520	30,560
Total.....	4,055,076*	53,139,761

\*The areas of many of these territories, especially those in Africa, are still in doubt, owing to the fact that the boundaries have never been definitely established. The total area given in this table is in accord with the best authorities.

**GOVERNMENT AND RELIGION.** The government is republican in form. The chief executive is a president, elected by the two houses of the national legislature for a term of seven years. The legislative department consists of the Chamber of Deputies and the Senate. The Chamber comprises members elected by universal suffrage for four years, and apportioned among the arrondissements. The Senate is composed of 300 members, chosen by direct election for nine years. The colonies are represented in the chambers. The president is assisted by a ministry, the members of which preside over the several departments of government.

For the purpose of local administration the country is divided into 84 departments. Each department is governed by a prefect, who is appointed by the president and is assisted by a council composed of a number of members equal



to the number of cantons. Each department is subdivided into arrondissements, there being four to a department. The arrondissement is again subdivided into eight cantons, and the cantons are subdivided into communes, the commune being the smallest unit for local government. Each commune comprises a town or a part of a town or one or more villages and is governed by a mayor, who is appointed by the government, and a municipal council, which is elected by the inhabitants. The peculiarity of the French government lies in the direct connection of the national government with all local government. Through appointments every officer is practically responsible to the heads of departments, and through them to the president.

The judicial system embraces a series of courts, at the head of which is the court of cassation at Paris, consisting of a president, three presidents of sections and 45 judges, or counselors. Below this are 26 courts of appeal; each having jurisdiction over several departments. These courts are engaged entirely with cases appealed from the courts in the arrondissements, known as courts of first instance, and below these are the justice courts of the cantons and communes.

By far the larger part of the inhabitants profess the Roman Catholic faith, and until recently there was a close connection between Church and State, but in 1906 this was completely dissolved. All religious beliefs have equal standing before the government, and all beliefs are tolerated.

ARMY AND NAVY. See ARMY, subhead *French Army*; NAVY, subhead *French Navy*.

CITIES. France has a number of important cities. At the head of these stands Paris, the political and commercial capital of the country and the largest city on the Continent. The other large cities, in the order of their importance, are Marseilles, Lyons, Bordeaux, Lille, Toulouse, Saint-Etienne, Roubaix, Nantes and Havre. Each of these is described under its title.

HISTORY. France, or Gaul, as it was called by the Romans, was inhabited during the earliest years in which we have any knowledge of it by a number of independent tribes, who appear to have been mainly Celtic in race. In the latter half of the seventh century B. C., the Romans conquered a portion of the southeast, and under Julius Caesar the conquest of all Gaul was completed, between 58 and 51 B. C. During the Roman occupation, the country became completely Romanized in language, civilization and religion, and many flourishing towns sprang up; but in the decline of the Roman Empire various

German tribes began to make settlements in the country, especially the Visigoths, the Burgundians and the Franks. It is from these last that the country took its name. Toward the close of the fifth century, Clovis, chief of the Salian Franks, completely overthrew Roman dominion and made himself master, not only of almost all France, but of considerable territory east of the Rhine. The dynasty which he founded is known as the Merovingian. On the death of Clovis, in 511, his kingdom was divided among his four sons, and a large part of the history of the Franks under the Merovingian kings is the history of the contests between Neustria and Austrasia, the two most important of the states into which the Empire was divided. Pippin of Heristal, mayor of the palace of the Austrasian king, conquered Neustria and thus brought all France under the same sway. He was the real ruler, although there was still a nominal king, as there was during the time of Pippin's son, Charles Martel. Pippin the Short, first mayor of the palace under the last of the Merovingian kings, was himself raised to the throne in 751. He was succeeded in his kingdom by his son, Charles the Great (See CHARLEMAGNE). Charlemagne's great empire was a German one, however, and there was as yet, strictly speaking, no kingdom of France.

On the death of Charlemagne's son, Louis the Pious, the empire was divided by the Treaty of Verdun (843) among his sons, Charles the Bald receiving that part which most nearly corresponds to modern France. It is at this time, therefore, that the separate history of France may be said to begin.

Charles the Fat, king of Germany, succeeded in 884 in making himself ruler of the Frankish territory also, but he was deposed after three years. After the brief usurpation of Odo, count of Paris, Charles III, the brother of Louis III, was recognized as king. His authority was little more than nominal, as France was divided into a number of great fiefs, the holders of which were practically independent. This circumstance made it impossible for Charles to offer any adequate resistance to the Norman pirates, whom he was obliged to buy off by surrendering to them the territory which took from them the name of Normandy. On the death of Louis V, in 987, Hugh Capet, the son of the most powerful of the great vassals, was raised to the throne, thus becoming the founder of the Capetian dynasty. The fact that the accession of the House of Capet added to the Crown the great

fiefs of Paris and Orleans made the central authority somewhat stronger than it had been under the Carolingian kings.

The first great task of the Capetian line was to reconquer the royal prerogatives from the great vassals, but for two centuries they were unsuccessful (See CAPETIAN DYNASTY). Louis the Fat, who came to the throne in 1108, was the first really strong ruler of the line. In his struggle with the nobles he was greatly helped by the fact that the latter had been much weakened by the Crusades and also by the increased power of the towns, who allied themselves with the king. (For the chief events under the later Capetian kings, see PHILIP II, AUGUSTUS; LOUIS IX; PHILIP IV.)

With the death of Charles IV, in 1328, the first branch of the Capetian kings became extinct, and Philip, of the House of Valois, a cousin of Charles IV, came to the throne, according to the Salic Law. The claim of Edward III of England to the throne of France led to a series of wars between the two countries, which lasted for over one hundred years (See HUNDRED YEARS' WAR; JOAN OF ARC; DU GUESCLIN, BERTRAND; CHARLES VI of France; HENRY V of England; CHARLES VII). Under Charles VII, France regained from England all of the territory of France, except Calais. The shrewdness and unscrupulousness of Louis XI (1461-1483) completed the subjugation of the great barons and laid the foundation of absolute monarchy (See LOUIS XI). Maine, Anjou and Provence were left to him by the will of the last count, and a large part of the possessions of the duke of Burgundy came to his hands shortly after the death of Charles the Bold of Burgundy. Louis's son and successor, Charles VIII (1483-1498), united Brittany to the Crown by his marriage with Anne of Brittany. During the reign of Charles VIII occurred the first invasion of Italy by France, which had such important results.

Charles was the last king of the direct line of Valois and was succeeded by Louis XII, of the House of Valois-Orleans. On his death the crown passed to another branch of the House of Valois, the Valois-Angoulême branch, in the person of Francis I (1515-1547). Francis continued the attempts at conquest in Italy and thus came into conflict with Charles V of Germany, who claimed Milan. The results were disastrous for Francis (See FRANCIS I). On the death of Francis, his son, Henry II (1547-1559), came to the throne, and he continued the struggle

with Austria. His reign is noteworthy, because during it began the persecution of the Huguenots. Francis II, the husband of Mary Queen of Scots, succeeded his father, Henry, but reigned little more than a year (1559-1560). During his reign and the reigns of his brothers, Charles IX and Henry III, intrigue and corruption gave to women a dangerous influence at court and in public affairs. During the reign of Charles IX, who was entirely under the influence of his mother, Catharine de' Medici, the struggle between Huguenots and Catholics came to a climax in the Massacre of Saint Bartholomew's Day (See BARTHOLOMEW'S DAY, SAINT; HOLY LEAGUE). These religious wars were terminated only when Henry IV of Navarre (1589-1610), the leader of the Huguenots, who became king of France on the death of Henry III, went over to the Catholic Church (See HENRY IV).

During the minority of Henry's son, Louis XIII, the policy of France was somewhat wavering, until the prime minister, Richelieu, gave it a steady direction (See RICHELIEU, ARMAND JEAN DUPLESSIS). He continued the policy of the former kings who had labored for the humiliation of Austria and relentlessly oppressed the Huguenots. Louis XIII died in 1643, the year after Richelieu, and was succeeded by his son, Louis XIV. Mazarin, during the years of Louis's minority, carried out the policy of Richelieu, and Louis XIV, when he took the rule into his own hand, proved to be a ruler of strong will and steady purpose (See LOUIS XIV). The close of this reign in 1715 found the finances in disorder, an enormous national debt imposed upon the country and industries in a depressed condition. Louis XV, the great-grandson of Louis XIV, succeeded him at the age of five years. During his minority, the regent, the duke of Orleans, squandered the revenues in a most reckless manner, and when Louis himself assumed the authority matters grew worse, rather than better, for he was constantly under the influence of mistresses, by whom he was led into useless and costly wars (See SUCCESSION WARS; SEVEN YEARS' WAR).

With the reign of Louis XVI began the period of reaction against the oppression which had been practiced on the people. The king himself was honest and well-meaning, but the whole administration was rotten, and the court, the nobility and the clergy formed a privileged class, united to oppress the people. The taxation, which was necessarily heavy, fell upon the peasantry only, leaving the two leisure classes



## France

untouched. The good intentions of Louis were neutralized by a total lack of energy and firmness, and he was unable to appreciate the fact that his few concessions could not materially improve a situation which called for the most thorough-going reforms. The great difficulty of his government was the hopeless condition of the public finances, with which Turgot, Necker, Calonne and Brienne in vain attempted to grapple. Finding all ordinary measures unavailing, Necker called for the congregation of the States-General, which had not met since 1614. This body met in May, 1789. (For an account of the ten years which followed this date, see FRENCH REVOLUTION, THE.) In 1799 Napoleon was made first consul, and for the next sixteen years the history of France is virtually the history of Napoleon (See NAPOLEON I).

Louis XVIII, who was placed on the throne of France on Napoleon's first abdication in 1814 and was restored in 1815 after the Hundred Days, at first governed with the support of a moderate liberal party. The reactionary spirit of the aristocrats and returned *émigrés* soon, however, came to predominate. Louis died in 1824 and his brother Charles succeeded him. The oppressive policies of the former reign were still more prominent under the new ruler, and finally, in 1830, the ministry published ordinances suppressing the liberty of the press and creating a new system of elections. The result was the insurrection of July, 1830, by which Charles X was overthrown and Louis Philippe, duke of Orleans, was proclaimed king (See LOUIS PHILIPPE). The new administration proved popular with no party, and in February, 1848, another revolution drove Louis Philippe into exile. A republic was proclaimed, and in December, 1848, Louis Napoleon, nephew of the great Napoleon, was elected president for four years. Three years later he established himself as president for a further term of ten years, and in 1852 he was able to have himself declared emperor, under the title of Napoleon III. When the votes of the people were taken, his seizure of the power was confirmed by over seven million votes (See NAPOLEON III).

In 1870 the uneasiness of Napoleon and the French at the steady growth of Prussian power reached a climax when the Spanish crown was offered to a prince of the House of Hohenzollern. The result of the behavior of France was the Franco-German War (See FRANCO-GERMAN WAR), which ended in the complete defeat of the French and the capture of Paris by the German

## Francia

armies. Immediately on the receipt of the news of the defeat at Sedan, a republic was proclaimed in Paris, and a period of civil war followed (See COMMUNE). Thiers, the first president, resigned in 1873, and Marshal MacMahon was put in his place. In 1875 a constitution was drawn up which provided for a legislative body to consist of two chambers. By 1879, at the resignation of MacMahon, the government of France had been considerably strengthened. Jules Grévy succeeded MacMahon and was reelected in 1885, but resigned two years later. He was succeeded by Sadi Carnot, during whose administration a serious attempt was made under General Boulanger to overthrow the republic. Three parties, the Orleanists, the Bonapartists and the Radicals, were interested in this movement, and as Boulanger was very popular throughout the country, it seemed as if matters might end disastrously for the government; but the popularity of the leader waned, and he was finally obliged to flee from the country. A great sensation was also created during Carnot's administration by the failure of the Panama Canal scheme, which led to the prosecution of a number of noted men (See PANAMA CANAL). Carnot was assassinated in 1894 and was succeeded by Casimir-Périer, who resigned in less than a year. His successor was Félix Faure, who was succeeded by Emile Loubet. In 1906 Loubet was succeeded by Clément Armand Fallières, who in 1913 was succeeded by Poincaré. In 1914 France became involved in the general European war, brought on by the murder of Archduke Franz Ferdinand of Austria. See WAR OF THE NATIONS; AUSTRIA-HUNGARY, subhead *History*. Population in 1911, 39,601,509.

**France**, ANATOLE (1844- ), a French critic, novelist and humorist whose real name is Jacques Anatole Thibault. *The Crime of Sylvestre Bonnard*, which has been several times translated into English, was published in 1881 and first won him fame. Among his other works are *Opinions of the Abbe Jerome Coignard*, *The Garden of Epicurus*, *Thais*, *The Red Lily* and *Isle of Penguins*. France was made a member of the French Academy in 1896.

**Franchise** *fran'chize*, in a general and legal sense, a particular privilege or right, granted by a government to an individual, association or corporation; as, a *franchise* to construct and operate street railways. The name is especially given to the right to vote.

**Francia**, *fran'cha* (1450-1518), whose real name was Francesco di Marco Raibolini, a

## Francis

famous Italian painter, engraver, medalist and goldsmith, was born at Bologna. He excelled particularly in painting Madonnas and executed a number of admirable frescoes in the Church of Saint Cecilia at Bologna, but his most famous work is an altar piece in the Church of Saint Giacomo Maggiore in the same city. Though his pictures are charming, they lack dramatic action, but this fault was slightly remedied in his later works, owing to the influence of Raphael.

**Fran'cis I** (1494-1547), king of France, ascended the throne in 1515, on the death of his father-in-law, Louis XII. In prosecution of his claim to Milan, he defeated the Swiss in the plains of Marignano and forced the reigning duke, Maximilian Sforza, to relinquish the sovereignty. On the death of the emperor Maximilian, in 1519, Francis was one of the competitors for the rank of emperor; but the choice fell on Charles of Austria, the grandson of Maximilian, henceforth known as Emperor Charles V. From this period Francis and Charles were rivals, and were almost continually at war with each other. Francis was at first severely defeated, and though later, with the aid of the Turks, he won victories, they brought no permanent advantage to France.

**Francis I** (1708-1765), Holy Roman emperor. In 1736 he married Maria Theresa, daughter of the emperor Charles VI, and after the death of Charles VI (1740) he was declared by his wife co-regent of all the hereditary states of Austria, but without being permitted to take any part in the administration. He was elected emperor in 1745.

**Francis II** (1768-1835), Holy Roman emperor and emperor of Austria, succeeded his father in 1792. France declared war against him in 1792, and hostilities continued till the Peace of Campo Formio in 1797. In 1799 he entered into a new coalition with England and Russia against the French Republic, but the result of the battles of Marengo and Hohenlinden was far from favorable to Austria. In 1804 Francis assumed the title of hereditary emperor of Austria, and in the following year, after the Battle of Austerlitz, he was forced to give up his title of Holy Roman emperor. In 1809 he again took up arms against France, and in the Peace of Vienna was compelled to surrender much territory. After the overthrow of Napoleon, Francis became a member of the reactionary Holy Alliance, under the guidance of his minister, Metternich.

**Francis'cans**, the members of the religious order established by Saint Francis of Assisi about

## Francis Joseph

1210. They are also called Minorites, or Fratres Minores, which was the name given them by their founder in token of humility, and sometimes Gray Friars, from the color of their garment. The order was distinguished by vows of absolute poverty and a renunciation of the pleasures of the world and was intended to serve the Church by its care of the religious state of the people.

**Francis Joseph I** (1830-1916), emperor of Austria, king of Bohemia and Hungary, succeeded his uncle, Ferdinand I, a mental and physical weakling who found himself unable to cope with the political disturbances of 1848 and on December 20 of that year abdicated in favor of his nephew. The Hungarians, in revolt, under the leadership of Kossuth, refused to recognize the new emperor, on the ground that the abdication could be valid only with the consent of the Hungarian parliament.



FRANCIS JOSEPH I

This revolt and another uprising in Sardinia were quickly crushed. For the next four years the emperor was almost completely dominated by his ministers, but in 1852 the personal rule of the emperor really began. Except on rare occasions Francis Joseph was thereafter the real ruler of his empire. He not only appointed ministers but controlled their policy. Owing to his great knowledge of affairs and his unending diligence and capacity for work, he had a real control even over the details of government. Early in his reign his policy was conservative—almost reactionary—but in later years he showed a broader view of affairs and a willingness to



## Francis of Assisi

grant necessary reforms. After the disastrous war with France and Sardinia in 1859 and the Seven Weeks' War with Prussia in 1866, Francis Joseph saw the need of liberal action, and in 1867 the relations of Austria and Hungary were adjusted by the grant of a constitution to Hungary.

In 1883 Francis Joseph became a party to the Triple Alliance, though Germany and Italy were nations built on the ruins of Hapsburg ambitions. In his foreign policy he was an advocate of European peace, though he seemed not unwilling to break it for the glory of Austria. In 1908, contrary to the Treaty of Berlin, he proclaimed the annexation of Bosnia and Herzegovina to Austria-Hungary.

In private life the emperor was the victim of many catastrophes—his wife, his brother, his only son and his nephew having met violent deaths. His brother, Emperor Maximilian of Mexico was shot in 1867. His son, crown prince Rudolph, committed suicide in 1889, and his wife, the Empress Elizabeth, was killed in Geneva, Switzerland, by an Italian anarchist in 1897. The last of these catastrophes was the assassination of the Archduke Franz Ferdinand, nephew of Francis Joseph and heir to the throne. The causes of this last tragedy and its terrible results are explained in the article AUSTRIA-HUNGARY.

**Francis of Assisi**, SAINT (1182-1226), founder of the Franciscans, born in Assisi, Italy. In 1208 he gave himself to a life of the most rigorous poverty. His followers were at first few, but when they reached the number of twelve he formed them into a new order and made a rule for them, including poverty, chastity, obedience, the giving up of every possession and living by alms. The order was sanctioned, though at first only verbally, in 1210 by Pope Innocent III. Pope Honorius III, in 1216, approved the order. The members were sent out as missionaries, Francis himself going to the East.

**Franck**, *frank*, CÉSAR AUGUSTE JEAN GUILLAUME HUBERT (1822-1890), a French musician and composer, born at Liège. He studied at the conservatory in his native town and later in Paris, where he finally settled. In 1872 he became organist at the conservatory. His compositions for the organ, though numerous, had attained little recognition before this time, and his oratorio *Ruth*, produced in 1846, was not successful. However, a quarter of a century afterward it was highly praised by French musicians. He is also known by his oratorio *The Beatitudes* and by his *Symphonic Variations* for piano and orchestra.

## Franco-German War

**Franco-German War**, the conflict between France and Germany in 1870 and 1871. The real cause of the struggle was the jealousy which France felt of Prussia, who had by her overthrow of Austria placed herself at the head of affairs in Germany and was threatening the position of France in Europe. The immediate cause, however, was the offer by General Prim of the crown of Spain to Leopold of Hohenzollern, a prince of the reigning house of Prussia. Napoleon III demanded of the king of Prussia that he should forbid Leopold to accept the candidacy, and when the prince voluntarily retired, Napoleon still insisted that the renunciation should be made formally by the king and that a guarantee should be given that the refusal was final. Prussia of course refused this demand, and the result was a declaration of war by France.

In Prussia the inevitability of war had long been foreseen, and the country was well prepared. In France, however, conditions were much less favorable, and Napoleon III was completely deceived as to the resources which he should have at his command. Thus, at the outset of the struggle the French had an army only about half as large as the Prussian, while back of the latter was a large reserve force. From the first France met with defeats. At Weissenburg and at Wörth the Germans were victorious, and they at length succeeded in separating the two divisions of the French army under MacMahon and Bazaine and preventing their junction. MacMahon, in September, 1870, was surrounded at Sedan by a German force overwhelmingly greater in number than his own and was on the following day compelled to surrender both army and fortress. Among the prisoners was Napoleon III. Meanwhile, Bazaine had been shut up in Metz, and in October of the same year he, too, was forced to surrender.

One of the first consequences of the defeat at Sedan was the deposition of Napoleon and the proclamation of the Republic. Immediate preparations were made in Paris to withstand a siege by the Germans, but the utmost efforts of the French could not relieve the city, and in February, 1871, it was forced to yield. By the terms of the treaty, which was signed in May of the same year, France was obliged to give up Alsace and a part of Lorraine and pay a war indemnity of about \$1,000,000,000; and it was provided that a German army should hold certain departments of France until the entire indemnity was paid. It was three years before the last of the German army left France.

## Francolin

**Fran'colin**, a genus of birds, related to the partridges and found in Asia and Africa. There are more than forty species, most of which are considered good game birds. The commonest is called the *redwing*, in South Africa, where the English colonists hunt it. The birds are very rapid on their feet and fly heavily with a whirring noise. They feed in the evening and morning, accompanying their labors with a loud, shrill cry that sounds somewhat like laughter.

**Frank'fort**, IND., the county-seat of Clinton co., 45 mi. n. w. of Indianapolis, on the Vandalia Line, the Lake Erie & Western and other railroads. The city is in an agricultural district, is supplied with natural gas and has manufactures of flour, crackers, lumber, bricks, machinery, agricultural implements and other articles. It supports a public library and has a fine courthouse and a high-school building. Population in 1910, 8634.

**Frankfort**, Ky., the capital of the state and the county-seat of Franklin co., 55 mi. e. of Louisville, on the Chesapeake & Ohio, the Louisville & Nashville and other railroads, and on the Kentucky River, in the heart of the blue-grass region. The stream is navigable and furnishes water power for numerous manufactures. On a hill near the city is the Franklin Cemetery, which is considered one of the most beautiful in the South. Here Daniel Boone is buried. The prominent buildings include the governor's mansion, the statehouse, an arsenal, the penitentiary, the home for feeble-minded children and the state normal school for colored students. Frankfort was founded by General James Wilkinson in 1786 and became the capital when the state was admitted to the Union. During the Civil War it was for a time the headquarters of General Braxton Bragg, with his Confederate forces. Population in 1910, 10,465.

**Frankfort-on-the-Main**, a town of Prussia, in the province of Hesse-Nassau, 20 mi. n. e. of Mayence (Mainz), mainly situated on the right bank of the Main. It has many very handsome, and some palatial, private residences, with gardens. The Römberg and the Rossmarket are the chief squares in the town. The Römer, or townhouse, was erected about 1405, but was not completed in its present form till 1740. The most remarkable of the churches is the Dom, or Cathedral, of Saint Bartholomew. Other buildings are the new opera house, one of the finest buildings of the kind; the courts of justice, of modern construction; the new exchange, a spacious and handsome edifice; the large palace

## Frankland

of the prince of Thurn and Taxis; the new railway station, a very elegant edifice, one of the finest in the world; the archive building; the postoffice; the house in which Luther dwelt and that in which Goethe was born. There are monuments to Gutenberg, Goethe, Schiller and others. Frankfort is rich in collections connected with literature and art and in establishments to promote them. The chief of these are the Historical Museum, the Städel Art Institute and the Rothschild Library. The manufactures, though not important, comprise chemicals, ornamental articles of metal, sewing machines, straw hats, soap, perfumery and beer. A great business is done in money and banking, and Frankfort is one of the chief financial centers of Europe. The town is a great railway center and is now reached by the largest vessels navigating the Rhine. It dates from the time of Charlemagne. In the thirteenth century it became a free city and for a long time after this was the place of the election of the German emperors. It was a prosperous and powerful city up to the time of the wars of the French Revolution, when it declined. On Napoleon's downfall, Frankfort became a free city, and by the Congress of Vienna (1815) it was made the seat of the German diet. In 1866 it was incorporated with Prussia. Population in 1910, 414,576.

**Frankfort-on-the-Oder**, a town of Prussia, in the province of Brandenburg, on the Oder, 52 mi. e. s. e. of Berlin. Among the chief buildings are the Church of Saint Mary, the Rathaus and a theater. The manufactures consist of machinery and metal goods, chemicals, leather, earthenware and spirits; and the trade is extensive, both by land and water. It has always been an important commercial center. Population in 1910, 68,230.

**Frank'ing**, the privilege of sending letters and packages through the mail without charge. The right was abolished by Parliament in Great Britain in 1840. In the United States it was first granted to Revolutionary soldiers, then to various officers of the government and to senators and representatives in Congress. It was abolished in 1873, but was later restored. It is now possible for all officers of the government to send public documents through the mail without charge. Seeds and agricultural reports are also sent free of charge. Some officers are allowed to use free stamped envelopes, marked *Official Business*.

**Frank'land** or **Frank'lin**, a name given to a state organization by inhabitants of what is now



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Tennessee, then a part of North Carolina, in 1784. A constitution was framed and ratified, and a legislature and a governor, John Sevier, were elected; but after a somewhat bitter struggle, the new government was suppressed by North Carolina in 1788. In 1790 the territory of Tennessee was ceded to the United States government, and thus the disturbance was quieted. See TENNESSEE, subhead *History*.

**Frank'lin**, a district of Canada, composed of all the islands north of the mainland, including Baffin Land and Prince Albert Land. The area is estimated at 500,000 square miles. No estimate of the population has yet been made, but it probably does not exceed a few hundred. Only one projection of Baffin Land extends below the Arctic Circle, and the whole territory is practically destitute of animal or vegetable life.

**Franklin, MASS.**, a town in Norfolk co., 27 mi. s. w. of Boston, on the New York, New Haven & Hartford railroad. It contains the Dean Academy, an almshouse and a public library. There are manufactures of pianos and of straw, cotton, wool, felt and other goods. It was incorporated in 1778. Population in 1910, 5641.

**Franklin, N. H.**, a city in Merrimack co., 95 mi. n. w. of Boston, Mass., on the Boston & Maine railroad and at the junction of the Pemigewasset and the Winnepesaukee rivers, where they unite to form the Merrimac. There is good water power, and the industries include paper mills, foundries and manufactures of woolens, hosiery, needles and other articles. Franklin is the birthplace of Daniel Webster. It was incorporated as a town in 1828 and became a city in 1895. It is the seat of the New Hampshire Orphans' Home. Population in 1910, 6132.

**Franklin, PA.**, the county-seat of Venango co., 123 mi. n. of Pittsburg, on the Allegheny River and on the Pennsylvania, the Erie and other railroads. The city is in the great oil fields and has flour mills, machine shops, foundries, brick-yards and manufactures of tools and other articles. The place was settled about 1753. Population in 1910, 9767.

**Franklin, BATTLE OF**, a battle of the Civil War in America, fought Nov. 30, 1864, at Franklin, Tenn., between a Federal force of about 25,000 under General Schofield and a Confederate force of about 40,000 under General Hood. It was the result of Hood's plan to draw Sherman from his advance to the sea by taking a large Confederate force into Tennessee and Kentucky and threatening the North Central

## Franklin

states. Thomas had been detached from Sherman's army and sent north to Nashville. Schofield was also given a considerable force, with instructions to delay Hood's advance northward as long as possible. The Confederates gradually forced Schofield to retreat toward Nashville, but the Federals made a stand at Franklin, on the south side of the Harpeth River. At first, through a misunderstanding of orders, the Federals were thrown into great confusion, but after a long struggle the Confederates were compelled to withdraw from the attack and Schofield retreated across the river and withdrew toward Nashville. It was one of the most sanguinary contests of the war and was noted for remarkable gallantry on the part of both forces.

**Franklin, BENJAMIN** (1706-1790), an American scientist, author and statesman, born at Boston, of humble parentage. He was apprenticed to his brother in the printer's trade and found opportunity to write secretly some articles in prose and poetry for the New England *Courant*, which his brother published. They were well received, but when his brother learned of their authorship, Franklin was severely lectured for his presumption and was treated with great harshness. Soon after, he quitted his brother's employment and, at the age of seventeen, started for Philadelphia, where he obtained work as a compositor. There he attracted the notice of Sir William Keith, the governor of Pennsylvania, who induced him to go to England, for the purpose of purchasing types to establish himself in business. Keith's support was soon withdrawn, and after a residence of eighteen months in London, Franklin returned to Philadelphia, where in a short time he formed an establishment with a person who supplied the necessary capital. They printed a newspaper, the *Pennsylvania Gazette*, which was managed with much ability. By Franklin's exertions a public library, improved systems of education, a scheme of insurance and other philanthropies were established in Philadelphia. In 1732 he began to publish his *Poor Richard's Almanack*, which was issued till 1757, winning for him a wide reputation as philosopher and wit.

In Boston in 1746 he saw, for the first time, some electrical experiments, which led him to begin those investigations which resulted in the identification of lightning and electricity and the invention of the lightning conductor. As member of the provincial assembly of Pennsylvania he became very active and was sent in 1757 to England as the agent of the province and was



BENJAMIN FRANKLIN  
From a painting in the Athenaeum, Boston





## Franklin

also soon appointed agent of the provinces of Massachusetts, Maryland and Georgia. Oxford and Edinburgh conferred on him their highest academic degrees, and the Royal Society elected him a fellow. In 1762 he returned to America, but was again appointed agent in 1764 and took to England a remonstrance against the project of taxing the colonies. He opposed the Stamp Act and in 1774 presented to the king the petition of the first American Congress, but realizing the futility of his efforts, he returned to America and was elected member of Congress. He exerted all his influence in favor of the Declaration of Independence. In 1776 he was sent to France as minister plenipotentiary, to obtain supplies from that court, and he concluded with France the first treaty of the United States with a foreign power (1778). He was subsequently named one of the commissioners for negotiating the peace with England. On his return to his native country, in 1785, he filled the office of president (governor) of Pennsylvania, served as a delegate in the Federal convention in 1787, approved the Constitution and did much to secure its ratification. His works include an unfinished *Autobiography* and a great number of political, anti-slavery, financial, economic and scientific papers.

**Franklin, JOHN**, Sir (1786–1847), an English Arctic voyager. He entered the navy as a midshipman at the age of fourteen and was present at the Battle of Copenhagen in 1801. He afterward accompanied Captain Flinders on his voyage to the coast of Australia (1801–1803). Shortly after his return he was appointed to the *Bellerophon* and had charge of her signals during the Battle of Trafalgar. His arctic work began in 1819, when he conducted an overland expedition for the exploration of the north coast of America, from Hudson Bay to the mouth of the Coppermine River. In 1845 he took command of the *Erebus* and *Terror* for an expedition in search of the Northwest passage. He never returned, and numerous search parties were sent out before any trace of him was found. In 1859 a document was found which gave the latest details of the ill-fated expedition. This paper stated that Sir John died June 11, 1847; that the ships were abandoned in April, 1848, and that the crews, 105 in number, had started for the Great Fish River. None survived, but many relics of the party have been recovered.

**Franklin, WILLIAM BUEL** (1823–1903), an American soldier, born in York, Pa. He graduated at West Point in 1843 and served in the Mexican War. Later he was appointed instruc-

## Fraternal Societies

tor at West Point, and at the outbreak of the Civil War he was appointed brigadier general. He served in the Battle of Bull Run and commanded a division and then a corps of the Army of the Potomac, in the Peninsula Campaign. In the following year he was promoted to be major general of volunteers, and, as commander of a corps, participated in the battles of Antietam and Fredericksburg. In the latter battle his dilatory conduct led to his temporary suspension, but he later served in the South. In March, 1865, he was brevetted major general in the regular army, but resigned from the service in 1866, engaging in the manufacture of firearms at Hartford, Conn.

**Franz-Joseph Land**, *frahnts'yo'zef lahnt*, an island group in the Arctic Ocean, lying n. of Nova Zembla. It consists of about 60 islands, much broken up by fiords and channels. The surface is made of basaltic rocks and is a plateau from 400 to 500 feet above the sea. The highest points rise to about 2800 feet. This land is largely covered by glaciers, though in some places lichens, mosses, poppy, saxifrage and other Arctic plants grow. It was discovered by the Austro-Hungarian expedition under Weyprecht and Payer, in 1873.

**Fraser River**, the principal river in British Columbia. It has its origin in the union of two branches. The one to the west receives its waters from a series of lakes, and, flowing in a southeasterly direction for 260 miles, it unites near Fort George with another branch from the east, which rises in the Rocky Mountains. From this point it flows south, and after a total course of about 750 miles it falls into the Gulf of Georgia. Its chief tributaries are the Stuart, the Chilcoten and the Thompson. Gold is found both on the Fraser and its affluents, and the salmon fisheries are important. New Westminster, Hope, Yale and Lytton are on its banks. Between Lytton and Yale the Fraser flows through some of the most beautiful scenery in the country.

**Fraternal Insurance.** See FRATERNAL SOCIETIES; INSURANCE.

**Fraternal Societies** or **Friendly Societies**, societies formed for the mutual advantage of the members and based upon the principle that by the contribution of the savings of many persons to a common fund, the most effectual provision can be made for casualties likely to affect all contributors. In England these societies are called *friendly societies*. They were first organized as sick clubs, composed of friends who



## Fraternities

met occasionally for recreation and social pleasure and who paid small sums to a common fund, for the benefit of sick members, or to pay the funeral expenses of deceased members. These societies have now become to a large extent fraternal insurance orders, and in addition to sickness and funeral benefits, they pay many other allowances, including accident and life insurance, old age pensions, widows' and orphans' annuities, and maintain homes and asylums for aged or invalid members. The Ancient Order of Foresters is the largest organization of the kind in England, while the Independent Order of Odd Fellows, organized in England, but now centered in the United States, is the largest order in the world. Fraternal societies in the United States have a total membership of over nine million. The principal orders and their membership in 1913 are given below:

Odd Fellows.....	1,581,045
Free Masons.....	1,567,800
Modern Woodmen.....	960,000
Knights of Pythias.....	715,654
Order of the Eastern Star.....	700,000
Woodmen of the World.....	642,300
Improved Order of Redmen.....	497,946
Knights of the Maccabees.....	283,901
Royal Arcanum.....	248,868
Foresters of America.....	241,439
Independent Order of Foresters.....	242,000
Eagles.....	347,569
Ancient Order of Hibernians.....	250,000
Benevolent and Protective Order of Elks.....	408,281
Knights of Columbus.....	287,313
Nobles of the Mystic Shrine.....	185,446

**Frater'nities, COLLEGE, or "Greek letter"** societies, as they are often called, organizations of students in colleges and universities of the United States. They receive their names from two or more letters of the Greek alphabet, as *Delta Kappa Epsilon*. Each of these letters is the beginning of a word of the secret motto of the fraternity. The purpose of such societies is literary and social. A fraternity is made up of several chapters in various colleges throughout the Union, but there can be only one chapter of the same society in a college. Each fraternity has a general government and holds conventions either annually or biennially. There are also some local organizations, which have but one chapter. The number of chapters in various fraternities varies from four to seventy-five. There are several professional fraternities, composed of students in medical, law and dental institutions. There are several similar organizations of young women, known as sororities. The first fraternity formed was *Phi Beta Kappa*,

## Fraunhofer

founded at William and Mary College, Va., in 1776. This is now an honorary organization. There are at present over a hundred college fraternities in the United States. Among the oldest, excepting the *Phi Beta Kappa*, were *Alpha Delta Phi*, 1832, at Hamilton College, N. Y.; *Psi Upsilon*, 1833, at Union College, N. Y.; *Kappa Alpha*, 1835, at Union College, N. Y.; *Beta Theta Pi*, 1839, at Miami College, Ohio; *Chi Psi*, 1841, at Union College, Schenectady, N. Y.; *Delta Kappa Epsilon*, 1844, at Yale.

The first women's fraternities, or sororities, to be organized were the *Kappa Alpha Theta*, at De Pauw University, in 1870; *Kappa Kappa Gamma*, at Monmouth College, 1870; *Delta Gamma*, at the University of Mississippi, 1872; *Alpha Phi*, at Syracuse, 1872; *Gamma Phi Beta*, at Syracuse, 1874.

**Fraud**, an act or course of deception, deliberately practiced with the view of gaining an unlawful or unfair advantage and resulting in legal injury to another. All frauds or attempts to defraud, which cannot be guarded against by common prudence, are indictable at common law and are punishable arbitrarily, according to the heinousness of the offense. Every species of fraud which the law recognizes renders voidable every transaction into which it enters as a material element. Fraud may be by false representation of fact, by concealment of material circumstances that ought to be revealed, by underhanded dealing or by taking advantage of imbecility or intoxication. A fraud involved in an act or contract which, though not originating in any actual evil or fraudulent design, yet has a tendency to deceive or mislead other persons, or to violate public or private confidence, or to impair or injure the public interests, is not actionable in a court of law, but is recognized in a court of equity, where it is known as *constructive fraud*. A suit for recovery of goods or for damages in such a case is usually sustained.

**Fraunhofer**, *frown'ho fur*, JOSEPH VON (1787-1826), a German optician. His many improvements in glass making, in optical instruments and in the polishing of lenses were eclipsed by his investigation of the innumerable, dark, fixed lines in the solar spectrum, known as *Fraunhofer's lines*. The importance of this discovery can scarcely be overestimated. It led to the invention and use of the spectroscope, to the science of spectroscopy and to all our present knowledge of solar and stellar chemistry.



## Frechette

**Frechette**, *fra shet'*, LOUIS HONORÉ (1839-1908), a French-Canadian author, born at Point Levi, Quebec. He was educated at Quebec Seminary and Laval University, studied law and was called to the bar of Lower Canada. After engaging for some years in newspaper work in Chicago he returned to Canada and represented his native county in the Dominion Parliament from 1874 to 1879. He then again took up newspaper work and was editor of several French papers in Chicago, Quebec and Montreal. His published collections of poems include *My Leisure Hours*, *Pell-Mell* and *The Legend of a People*; he translated Howell's *A Chance Acquaintance* and Cable's *Creole Days* into French and wrote numerous essays. The French Academy elected him a member and he was a knight of the Legion of Honor.

**Fred'eric**, HAROLD (1856-1898), a journalist and novelist, born in Utica, N. Y. He graduated at Hamilton College when twenty years old. Beginning his career as a proof reader, he rapidly advanced until he became the London correspondent of the *New York Times*. After going to England, in 1884, he wrote several novels, chiefly of rural life in his native state. Prominent among them are *Seth's Brother's Wife* and *The Damnation of Theron Ware*, the latter a vivid analysis of a phase of religious life in America.

**Fred'erick**, MD., the county-seat of Frederick co., 60 mi. n. w. of Baltimore, on Carroll's Creek and on the Baltimore & Ohio and the Pennsylvania railroads. The city has large canning establishments, planing mills, brick yards, flour mills and manufactures of tobacco, hosiery and other articles. Its chief interest lies in its connection with important historical events and characters. During the Civil War the place was twice occupied by Confederate troops, and the second time the citizens were forced to pay a very heavy ransom. Whittier has caused Frederick to be ever remembered as the scene of his famous poem, *Barbara Frietchie*. The place was settled about 1745 and was incorporated in 1817. Population in 1910, 10,411.

**Frederick**, a name borne by European sovereigns of various nations. Among them may be mentioned *Holy Roman emperors*, Frederick III (1415-1493) (See also FREDERICK I, BARBAROSSA; FREDERICK II); *kings of Prussia* (See FREDERICK I; FREDERICK II; FREDERICK III); *kings of Denmark*, Frederick I (about 1471-1533), Frederick III (1609-1670), Frederick V (1723-1766), Frederick VI (1768-1839) and

## Frederick

Frederick VII (1808-1863). See also FREDERICK VIII, of Denmark.

**Frederick I** (1657-1713), king of Prussia, son of the great elector Frederick William. He succeeded his father as elector of Brandenburg in 1688 and some years later assumed the title of king of Prussia. His reign was unimportant.

**Frederick II** (1712-1786), king of Prussia, known as Frederick the Great. He was the son



FREDERICK THE GREAT

of Frederick William I and the princess Sophia of Hanover, sister of George II of England. He was in his youth cruelly treated by his father, and at one time he narrowly escaped the death punishment for an attempt to flee to England. In 1733 he was obliged to marry the princess Elizabeth Christina, daughter of the duke of Brunswick-Bevern. The death of his father raised him to the throne in 1740, and it was not long before he asserted the claims of the House of Brandenburg to a part of Silesia, then held by Maria Theresa. As his proposals were rejected, he occupied Lower Silesia, defeated the Austrians near Mollwitz and at Chotusitz, and the First Silesian War was terminated by the peace signed at Berlin in 1742, leaving Frederick in possession of Silesia. Soon the Second Silesian War broke out, the result of which was equally favorable for Frederick. By the Peace of Dresden he retained Silesia and acknowledged the husband of Maria Theresa, Francis I, as emperor.

During the years of peace which followed,



## Frederick

Frederick devoted himself to domestic administration and to the improvement of the military system. He perfected the organization of his army, and learning that Maria Theresa, who had made strong alliances, meant to make a renewed attempt to gain Silesia, he anticipated his enemies by the invasion of Saxony (1756), with which the Seven Years' War began. The Peace of Hubertsburg (1763) terminated this war, and Frederick was allowed to keep the territory over which there had been so much contention. Frederick came out of this war with a reputation which promised him, in the future, a decisive influence in the affairs of Germany and Europe. His next care was the relief of his kingdom, drained and exhausted by the contest. This he prosecuted with great diligence and liberality, making many improvements in institutions and in agriculture. On the partition of Poland in 1772 Frederick received a large accession to his dominions. In 1779 he frustrated the designs of Emperor Joseph II on Bavaria, and the War of the Bavarian Succession was terminated without a battle by the Peace of Teschen. Late in life Frederick concluded, in connection with Saxony and Hanover, the confederation of the German princes. Frederick was a patron of literature and a friend of Voltaire, who lived for some time at his court, and he was himself the author of several works.

**Frederick III** (1831-1888), king of Prussia and emperor of Germany. In 1858 he married the princess royal of Britain, eldest daughter of Queen Victoria. He commanded the army of the Oder in the war with Austria (1866), and in the Franco-German War he led the army which ultimately forced Napoleon III and his army to surrender at Sedan. Early in 1888 he came to the throne, but he died three months later and was deeply mourned.

**Frederick I**, BARBAROSSA (1122-1190), Holy Roman emperor, received the imperial crown in 1152 on the death of his uncle, the emperor Conrad III. His principal efforts were directed to the extension and confirmation of his power in Italy. He set out on a crusade to the Holy Land in 1189 and gained two victories, but was drowned while crossing a stream in Cilicia. Frederick was one of the wisest and best of the emperors, and the belief was long current in Germany that he would some day return to rule his people.

**Frederick II** (1194-1250), son of the emperor Henry VI and of Constance, heiress of Sicily. He remained under the guardianship of Pope

## Fredericksburg

Innocent III till 1209, when he took upon himself the government of Lower Italy and Sicily. Three years later he was crowned emperor, promising to undertake a crusade in return for the pope's aid against his rival, Otho IV. It was not, however, until 1227 that he actually set out on that expedition. Frederick's ambition aimed at the subjugation of Lombardy, the sovereignty of all Italy and the reduction of the popes to their old spiritual office as the leading bishops in Christendom. This led him into constant struggles in Germany and Italy. He was one of the ablest and most accomplished of the long line of German emperors.

**Frederick VIII** (1843-1912), king of Denmark, succeeded his father, Christian IX, in 1906. Frederick was married in 1869 to Louisa, daughter of Charles XV of Sweden and Norway, and eight children were born to them. At Frederick's death his son succeeded as Christian X.

**Fred'ricksburg**, VA., a city in Spottsylvania co., 60 mi. n. of Richmond, on the Rappahannock River and on the Potomac, Fredericksburg & Piedmont and the Richmond, Fredericksburg & Potomac railroads. The manufactures include flour, silk, woolen and leather goods, iron, shoes, cigars and other articles. The town was connected with Captain John Smith and his early adventures. During the Civil War it changed hands several times and was the scene of several important battles (See FREDERICKSBURG, BATTLE OF). The city has a public library, a beautiful park and Stonewall, Confederate and National cemeteries. Population in 1910, 5874.

**Fredericksburg**, BATTLE OF, one of the most important battles of the Civil War, fought December 13, 1862, between a force of 125,000 Federals under General Burnside, supported by Sumner, Hooker and Franklin, and a force of 80,000 Confederates under Lee, supported by Jackson and Longstreet. After Lee's retreat from his first invasion of the North, the two armies had returned to their former positions near Fredericksburg, Lee occupying a practically impregnable position on bluffs overlooking the town, while Burnside was at Falmouth, on the opposite bank of the Rappahannock. On December 12, however, he crossed the river in three divisions and advanced against Lee on Marye's Heights. After six assaults which resulted in not the slightest gain, but in terrible slaughter, he was compelled to withdraw. His loss was 12,500, while that of the Confederates

## Frederick William

was about 5400. This battle resulted in the removal of Burnside from the command of the Army of the Potomac. See CIVIL WAR IN AMERICA.

**Frederick William** (1620–1688), elector of Brandenburg, generally called the Great Elector. At the age of twenty he succeeded his father, and he found the country devastated by the Thirty Years' War and weakened by the misrule of his predecessors. He must be considered as the founder of Prussian greatness and as the creator of a military spirit among his subjects. His part in the wars against Louis XIV, and especially his victory over the Swedes at Fehrbellin, gave to his country a prominence which it had never before attained. He left to his son a country enlarged and improved and a well-supplied treasury.

**Frederick William I** (1688–1740), king of Prussia, son of Frederick I and father of Frederick the Great. On his accession to the throne in 1713, he endeavored to increase the army and reform the finances, and he became the founder of the exact discipline and regularity which have since characterized the Prussian army. He had a childish love for tall soldiers, and he brought tall men from all countries and compelled them to serve in his army. A large part of Swedish Pomerania was annexed to Prussia during his reign.

**Frederick William III** (1770–1840), king of Prussia, son of Frederick William II, whom he succeeded in 1797. During the early part of the Napoleonic struggle he remained neutral, but popular feeling finally compelled him to join the coalition against France, and Prussia suffered much through defeats at Jena, Auerstädt, Eylau and Friedland. After peace was secured, Frederick William showed himself largely in favor of the reactionary principles of Metternich and the Holy Alliance.

**Frederick William IV** (1795–1861), king of Prussia, son of Frederick William III. When he succeeded to the throne by the death of his father in 1840, he gave some slight promise of a liberal government, but he soon showed his reactionary tendencies, and in 1848 occurred the rising of the people and the demand for a constitution. Frederick was able to force upon the country a constitution of his own making, which allowed small concessions. Latterly his mind gave way, and he sank into a state of hopeless imbecility.

**Fredericton**, a city of New Brunswick, the capital of the province, on the Saint John River.

## Freedman's Bureau

84 mi. from its mouth, and on the Canadian Pacific, the Canada Eastern and other railways. The river is navigable to this point for large sea-going vessels. The city is well built and has a number of handsome public buildings. Lumbering and trading are the chief industries, but there are also manufactures of machinery, leather and boots and shoes. The original village, known as Saint Anne, was founded in 1740. Population in 1911, 7208.

**Fredonia**, N. Y., a town of Chautauqua co., on the Dunkirk, Allegheny Valley & Pittsburg railroad, 45 mi. s. w. of Buffalo. A state normal school and a free library are located here. The industries of the village are largely connected with the grapes which are so extensively raised in the surrounding district. Fredonia was settled in 1803 and was incorporated in 1829. Population in 1910, 5285.

**Free Church of Scotland**, a Presbyterian church organized as a separate body from the Established Church in 1843. In 1834 the general assembly passed a *veto act*, which declared that no minister should be appointed to a parish church against the will of the people, and that a majority of male heads of families, full members of the church, should be able to bar such a person. This act brought the ecclesiastical and civil powers into conflict. The struggle was brought to an issue by the judgment of the House of Lords in 1842, affirming a decree of the court of session, which required the presbytery of Auchterarder to place a minister in Auchterarder parish without regard to the dissent of the parishioners. In 1843, when the members of the general assembly met at Edinburgh, they protested against the interference of the civil courts with the Church, and some of them withdrew and formed the Free Church of Scotland.

**Free Cities**, a name given to certain cities of Germany which were members of the German Confederation and exercised sovereign jurisdiction within their own boundaries. At the time of the French Revolution the free or imperial cities numbered no fewer than fifty-one; but with the exception of Hamburg, Lübeck and Bremen, they have all been deprived of their privileges as a result of various political changes.

**Freedmen's Bureau**, a bureau organized in the war department of the United States by an act of Congress passed March 3, 1865. Its purpose was to take general charge of the enfranchised negroes of the South, and it was authorized to assign to the freedmen allotments



## Freight

chief buildings are the cathedral, a large and beautiful Gothic structure, with a fine portal, richly sculptured and surmounted by a tower, with a spire of exquisite open work 380 feet high; the Ludwigskirche; the university, founded in 1456; the museum; a theater, and the grand-ducal palace. The manufactures are numerous and include tobacco, leather, chocolate and glass. Population in 1910, 83,324.

**Freight**, *frate*, a term used to denote merchandise in process of transportation; also the amount given for the transportation of merchandise. It was originally applied only to merchandise carried by water, but its meaning has now been extended to cover the transportation of goods by land, as well. The transportation of freight is governed by a contract, usually called a *bill of lading*, which may stipulate certain conditions of carriage; but in general it must conform to common usage. The most important principle of the law governing freight is that compensation is earned only when the contract has been fully performed; for instance, if the contract states that the cargo is to be deposited at a certain point, the carrier cannot claim compensation for a part of the voyage if the freight is not delivered at the specified destination. See CARRIER, COMMON; BILL OF LADING.

**Frelinghuysen**, FREDERICK THEODORE (1817-1885), an American lawyer and politician born in Millstone, N. J., educated at Rutgers College. He was admitted to the bar and became city attorney of Newark in 1849. He was also widely known as a corporation lawyer and was a prominent Whig and Republican. From 1861 to 1866 he was attorney-general of the state and in the latter year was appointed United States senator to fill a vacancy. In 1870 he was appointed to succeed Motley as minister to Germany, but declined, and in the following year he was elected to the United States Senate. Frelinghuysen was one of the framers of the electoral commission bill in 1876 and served upon the commission. After several years of retirement he succeeded Blaine as secretary of state in 1881.

**Fremont'**, NEB., a city and the county-seat of Dodge co., on the Platte River, 36 mi. w. of Omaha, on the Union Pacific and other railroads. The industrial establishments include breweries, flour mills, iron foundries, planing mills, carriage, furniture and cigar factories, stockyards and pork-packing houses. The town was first settled in 1856 and was incor-

## Fremont

porated in 1871. Population in 1910, 8718.

**Fremont**, OHIO, the county-seat of Sandusky co., 30 mi. e. of Toledo, on the Sandusky River and on the Lake Shore & Michigan Southern and the Lake Erie & Western and other railroads. Being at the head of steamship navigation on the river and in the center of a rich agricultural region and of productive oil and natural gas fields, it is a city of considerable commercial and industrial importance. Its chief manufactures are agricultural implements, boilers and engines, electro-carbons, cutlery, beet sugar and lumber products. A trading post was established here as early as 1785, and Fort Stephenson was erected in 1812. It was a popular rendezvous of Indian tribes. Population in 1910, 9939.

**Fremont**, JOHN CHARLES (1813-1890), an American soldier and explorer, born in Savannah, Georgia, and educated at Charleston College. He entered the government service as topographical engineer and, in pursuit of a plan to make a geographical survey of all the territories



JOHN C. FREMONT

of the United States, explored the Rocky Mountains in 1842. In the following year he set out to explore the territory between the Rockies and the Pacific coast, and after a trip filled with the greatest hardships, he returned in July, 1844. In 1845 he again led a government expedition to the Rocky Mountain region and came into conflict with the Mexican authorities, who were then preparing for war with the United States. He retired to Oregon, but later returned

## French

to California and led a revolt against Mexican authority, becoming military commander and civil governor of California. Toward the end of 1846, a United States force under General Kearney arrived in California, but Fremont refused to recognize Kearney's authority. For this he was court-martialed and was convicted of mutiny and disobedience and sentenced to dismissal from the service. President Polk remitted this penalty, however, and Fremont resigned. Two years later he led another exploring party across the Rockies; he made a last exploring trip in 1853, but accomplished little. Fremont was the first United States senator from the state of California and in 1856 he was nominated as the first candidate of the Republicans for the presidency, but received only 114 electoral votes to Buchanan's 174. At the outbreak of the Civil War, he was appointed major general, with command of the western department. In this position he hindered the administration by a hasty and ill-advised order of confiscation, and he was removed from command by President Lincoln in November, 1861. He was given command of another department later. In 1864 he became the candidate for president of a small faction of the Republican party. He received little support and withdrew his name in September. After the war he was interested in railroad enterprises and from 1878 to 1882 was governor of Arizona. Consult Fremont's *Memoirs of My Life*.

**French, ALICE** (1850- ), a story-writer, better known as Octave Thanet, born in Andover, Mass., and educated at Abbott Academy there. As she lived in the West and in the South, she drew in her short stories intimate pictures of life in those regions. Among her collections of stories are *Otto the Knight* and *Knitting in the Sun*. *An Adventure in Photography* is illustrated from actual photographs of the adventurers. *We All* is a charming story for children. Among her later works are *The Man of the Hour* and *The Lion's Share*.

**French, DANIEL CHESTER** (1850- ), an American sculptor, born at Exeter, N. H. His first work was very crude, but he studied conscientiously and was encouraged by Louisa M. Alcott, who was his first critic. He began by modeling animals and birds. At the age of nineteen he became a pupil of John Quincy A. Ward and later went to Europe, where he studied at Florence for several months. His first important work was *The Minuteman*, and this was followed by some important portraits and

## French and Indian Wars

statues, the best of which are *John Harvard*, *Lewis Cass* and the *Gallaudet Monument*, which is at Washington. Among his other works are a great memorial statue called *Washington*, a bronze statue executed as a gift of American citizens to France; the *Memorial Angel*, a sculpture design for a monument in Boston; the bronze doors for the Boston Public Library, and *Death and the Sculptor*, which is his greatest work, now in New York City. This was one of the best pieces of sculpture at the Chicago World's Fair of 1893.

**French and Indian Wars**, a name given to the series of four wars between the French and the English in America in the seventeenth and eighteenth centuries. They were the result partly of the conflicting interests in Europe, and partly of the divergent claims of the two countries in America, England holding that settlements upon the coast gave title to land stretching from sea to sea; France, that settlement at the source of a river gave title to all lands drained by the river. As the colonies of both countries expanded westward, migration began, and the representatives of the rivals soon came into conflict.

**KING WILLIAM'S WAR.** The first war, known in America as King William's War, was simultaneous with the War of the Palatinate in Europe, begun in 1689, and its opening was signalized by expeditions against the frontier towns of New York and New England sent out by Governor Frontenac of Canada. Hundreds of settlers were captured and killed. In retaliation the English colonists sent out two expeditions, one by land and one by sea, for the conquest of Canada. Both failed, and at the Peace of Ryswick in 1697 mutual restitution of all conquered territory in America was made.

**QUEEN ANNE'S WAR** was the outgrowth of the War of the Spanish Succession waged in Europe. It began in the southern colonies with an expedition from South Carolina against Spanish towns in Florida and a counter-attack upon Charleston. The alliance between the Algonquin Indians and the French in the north proved disastrous to frontier settlements in New England, especially Deerfield and Haverhill, Mass. The English dispatched three expeditions against Acadia, the last one, in 1710, being successful. By the Peace of Utrecht in 1713 the Hudson Bay territory, Acadia and Newfoundland were ceded to England.

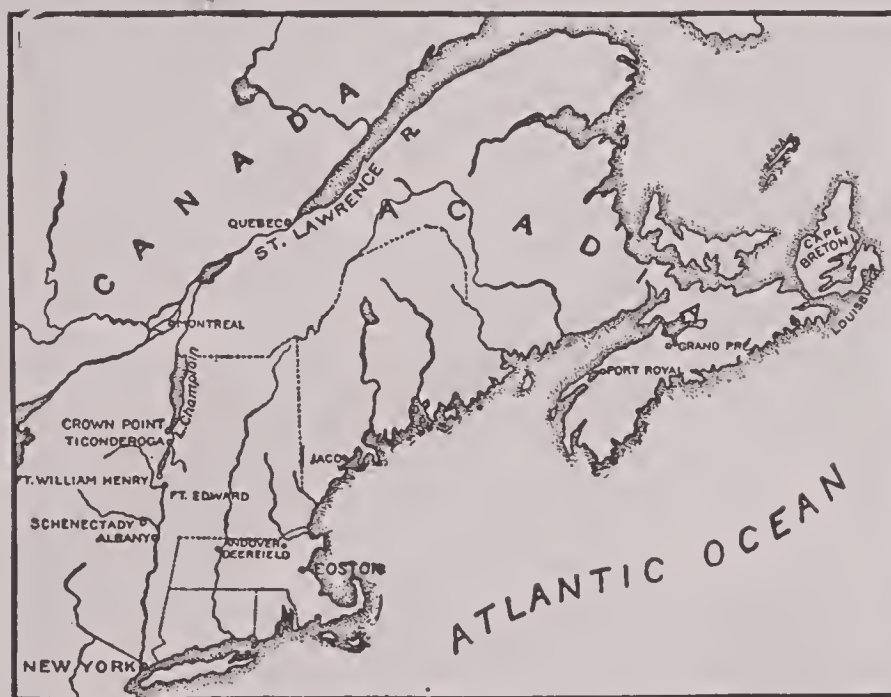
**KING GEORGE'S WAR** consisted of the American operations in the War of the Austrian



## French and Indian Wars

Succession. The first movement was a French expedition against British ports in New England and Newfoundland. The most important event of the contest was the brilliant campaign against Louisburg, Cape Breton Island, conducted by colonial forces under William Pepperell of Maine. The stronghold surrendered June 17, 1745. By the Treaty of Aix-la-Chapelle (1748), Louisburg was restored to France, contrary to the wishes of the New Englanders, and all other conquered territory was restored to its status before the war.

**THE FRENCH AND INDIAN WAR.** The last of the four wars, often known as the French and Indian War, was an American phase of the Seven Years' War between England and France.



FRENCH AND INDIAN WARS IN THE NORTH AND EAST

The three preceding struggles had accomplished nothing toward a final settlement of the territorial controversy, and frontier settlements of the two nations in the north and west constantly approached each other. The opening gun of the war was fired in 1755, when a force of Virginian volunteers under George Washington was compelled to surrender Fort Necessity, which they had built for the defense of the western region. In the same year an English force under General Braddock retaliated for this defeat by an attack upon Fort Duquesne, at the junction of the Monongahela and Allegheny rivers, on the site of the English Fort Pitt. The force was attacked in ambush and completely routed, with great loss. Other expeditions against Canada, by way of Lake

Champlain and Fort Niagara, were also unsuccessful. Not until 1758 did the tide of fortune turn in favor of England. In that year Louisburg and Fort Duquesne were captured and in the following summer Ticonderoga, Crown Point and Niagara. The crowning and closing event of the war was the successful invasion of Canada by an English force under General Wolfe (See WOLFE, JAMES; MONTCALM, LOUIS JOSEPH; QUEBEC). By the terms of the Treaty of Paris in 1763, Canada and all lands east of the Mississippi were ceded by France to England. Louisiana and all lands west of the Mississippi and the Isle of Orleans were ceded by France to Spain, and Florida was ceded to England by Spain. Thus, France was driven

from the North American continent and Spain remained the only rival of England in the New World.

**French Broad River,** a river of North Carolina and Tennessee, rising in Henderson County in North Carolina. It flows northwest into Tennessee and empties into Holston River four miles above Knoxville. The scenery from Asheville to the Tennessee line is remarkably beautiful, the river flowing through deep mountain gorges. In Buncombe County, North Carolina, these precipices are between 200 and 300 feet high.

**French Guiana.** See GUIANA, FRENCH.

**French Indo-China,** the name applied to the French possessions in southeast Asia, including the colonies of Cochin-China and the protectorates of Cambodia, Annam, Laos and Tongking. It is bounded on the east and south by South China Sea, on the southeast by the Gulf of Siam, on the west by Siam and on the north by China. The total area is estimated at 255,000 square miles. The seat of government is at Saigon. At the head of the administration is a governor-general, under whom are the governor of Cochin-China and the superiors of the four protectorates. In 1900 Quang-Chi Wan, on the China coast, was leased from China, and is now a part of Indo-China. Population estimated at 16,000,000 to 20,000,000. See ANNAM; CAMBODIA; COCHIN-CHINA; TONGKING.

## French Kongo

**French Kongo**, a region of west central Africa extending along the coast between the German Kamerun territory on the n. and Kabininda on the s., and inland to the Kongo and Ubangi Rivers. It touches, on the north, Upper Ubangi and Wadai, and covers an area of about 550,000 sq. m., the boundaries being not yet defined. This territory is probably the most valuable of the African colonies. The country is very fertile and produces many important exports. Gold and iron abound in some parts. Rubber, ivory, various woods, coffee, cocoa and palm oil are the chief exports. Among the rivers are the Gabun, Sanga, Ogowai, Lalli and Licona, of which the Sanga is an excellent waterway. Loango is the only good harbor, and most of the trade passes through it. Other important towns are Libreville, the capital, Franceville and Brazzaville. The government is administered by a commissioner general and an administrative council, the upper regions along the Kongo being under military control. The coast was first discovered by the Portuguese in 1470. In 1842 the French established a post on the Gabun River and became actively interested, and seven years later Libreville was founded. The population is estimated at between 8,000,000 and 15,000,000.

**French Language.** At the time of the conquest of Gaul by Julius Caesar, the principal dialects spoken by the inhabitants were Celtic (See CELTS). After the conquest these dialects were gradually supplanted by Latin, except in Brittany, where a Celtic dialect still holds its ground. The popular Latin of Gaul of course exhibited considerable differences from the written and classic Latin, and by the seventh or eighth century the literary and the popular languages had come to be quite clearly distinguished. Besides the Celtic words, not very numerous, which were imported into the new speech, Latin was considerably modified by Celtic habits of speech, new sounds being introduced. It was still further modified by the influences introduced with the Teutonic invasions. The half-barbarous conquerors, incapable of mastering the intricacy of Latin inflections, mostly neglected them, using only the simpler forms. They enlarged the vocabulary also by a number of words, mostly terms of war and hunting. After the Franks in Gaul had abandoned their native language and adopted this new Romanic, or Romance, tongue it became known as the *Francisca*, later *Franceis*, from which the modern term *French* is derived. The

## French Revolution

oldest known monument of the new dialect is the oath of Louis the German, taken at Strassburg in 842.

In the ninth and tenth centuries two main branches or groups of dialects came to be recognized, the *langue d'oc*, spoken in the districts south of the Loire, and the *langue d'oïl*, spoken in a variety of dialects in the provinces of the north and east. The names were derived from *oc* and *oïl*, the words meaning *yes* in the two districts. *Langue d'oc* may be said to have reached its height in the Provençal poetry and dialect, known especially in connection with the Troubadours. In the thirteenth century the political superiority of the north brought about the decline of the *langue d'oc*, and a dialect of the *langue d'oïl*, spoken in the central province of Ile de France, where the capital, Paris, was, came to be regarded as the classical language of the country, all other dialects being used only by the ignorant classes. At the beginning of the sixteenth century Francis I prohibited the use of Latin at court and in the public tribunals and formally recognized French as the national language. As one of the Romance languages, it is a sister tongue of Italian, Spanish and Portuguese. See LATIN LANGUAGE; PHILOLOGY.

**French Literature.** See LITERATURE, subhead *French Literature*.

**French Revolution,** THE, the great revolution in France at the end of the eighteenth century. The term in this article is understood to mean the years between the outbreak of the struggle in 1789 and the overthrow of the Directory by Napoleon in 1799. For the causes which led up to the struggle, see FRANCE, subhead *History*.

The summoning of the States-General in 1789 was virtually an abandonment of the principle of absolute monarchy in France. The first question which this body was forced to settle was that of the method of voting. The old method had been by class rather than by poll, but if this were pursued, it would mean that the nobles and clergy together could counteract the efforts of the third estate for reform. The nobles and clergy proved firm in their refusal to vote by head, and the third estate withdrew in June, 1789, and declared itself the National Assembly of France. Later, this body was joined by many of the nobles and clergy, and assumed the name of the Constituent Assembly. It voted to adopt a constitution before adjourning and declared the inviolability of its members. The dismissal of Necker, the popular minister, a step to which



## French Revolution

Louis XVI was led by his desire to offset the measures of the Assembly, brought about the first open insurrection of the people—the storming of the Bastille. The Assembly next declared all feudal rights and privileges abolished; the National Guard was organized, and the nobles who were unwilling to accept the Revolution left France. In October of the same year a mob, composed largely of women, rushed to Versailles, put to death the royal guard and forced the king and queen to return with them to Paris. The Constituent Assembly also removed to Paris and there continued to work on the new constitution, which was ready in July, 1790. The king's oath to support the constitution was regarded by the people with suspicion, and this suspicion was increased by the constant attempts of the émigrés to gain assistance from foreign powers against the revolution (See EMIGRÉS). In June, 1791, the king and queen tried to escape from France, but were captured and brought back to Paris, where Louis was made to take oath on a revised constitution. The Constituent Assembly dissolved itself in September, 1791, and was followed by the Legislative Assembly.

In 1792, when peace was especially needed in France, war was begun with Austria and Prussia, and the early defeats of the French forces were the cause of risings of the mob in Paris. A rioting band broke into the Tuilleries in August, killed the king's guard and forced Louis to throw himself on the mercy of the Legislative Assembly. The mob then forced the Assembly to imprison the king in the Temple and to declare him suspended from his royal office. In September, 1792, as a result of further reports of French defeats, serious riots broke out in Paris, and hundreds of the inmates of the prisons were murdered. The Battle of Valmy, in which the French were victorious, served to quiet the disorder in Paris for a time. The success in war was continued under the National Convention, which assembled September 20, 1792. Savoy was invaded, Belgium was conquered and Dumouriez defeated the Austrians at Jemmapes. Meanwhile, however, France had been declared a republic by the National Convention, and the announcement was now made that Belgium and Savoy were to be annexed to France. This brought forward new enemies for France, and these enemies were strengthened in their opposition to the revolutionary movement by the execution of the king.

The Convention was rent by the strife of two

## French Revolution

parties, the Jacobins and the Girondists. The latter at first had the majority, but their very unpractical character made them unfit to manage affairs at so critical a time, and the radical Jacobins before long gained control. They brought the king to trial in December, 1792, and he was condemned to death and executed January 21 of the following year. In June of that year the Jacobins were strong enough to arrest and put to death the leaders of the Girondists, and they thus held matters entirely in their own hands. The French armies were now meeting defeat at the hands of Great Britain, the Netherlands and Spain, and the results were the same as they had been earlier.

France was now controlled by a Committee of Public Safety, which consisted of a number of the most radical members of the Convention, under the leadership of Danton. The Reign of Terror began with the installation of that body. Among the first who fell under the suspicion of the government were Philippe Egalité, who had renounced his rank and had early identified himself with the Revolution; Marie Antoinette, and Madame Roland. They were given mock trials and sent to the guillotine. Gradually one man began to stand out supreme—Robespierre. First, with the help of Danton, he overthrew Hébert and his party and sent them to the guillotine and then turned upon Danton and his followers, who had ventured to suggest that the Terror was passing beyond all bounds, and had them put to death. Robespierre's own turn soon came, however, and in July, 1794, he himself was beheaded (See TERROR, REIGN OF).

The more moderate members of the Convention, who had been expelled earlier, were now brought back, and in 1795, by a new constitution, the government was placed in the hands of a Directory of five persons and two legislative bodies, the Council of Ancients and the Council of Five Hundred. When an attempt was made to enforce this constitution, an insurrection in Paris was the result, and it was in suppressing this insurrection that Napoleon Bonaparte first became really prominent. Napoleon, in command of the French army in Italy, won some brilliant successes, and it seemed as if the good fortune which had attended the Convention in its latter days would continue under the Directory. Such, however, was not the case. The Austrians, while Bonaparte was absent in Egypt, invaded Italy and several times defeated the French. With the internal conditions under the Directory, also, there was great dissatisfaction.

## French Somaliland

The financial difficulties could not be met; it was perceived on all sides that the government was generally weak and inefficient, and there were threats of a royalist reaction. The one desire of France now seemed to be for a strong central government, and Napoleon, still absent in Egypt, perceived that his opportunity had come. He returned to France in October, 1799, and three weeks later overthrew the Directory and put himself at the head of affairs.

For the further course of the Revolution, see NAPOLEON I. See, also, articles on men mentioned above, and MARAT, JEAN PAUL; MIRABEAU, GABRIEL HONORE RIQUETTI.

**French Somaliland**, *so mah'le land*, a French possession in northeast Africa, bounded on the w. by Abyssinia, on the s. and s. e. by Abyssinia and British Somaliland, on the e. by the Gulf of Aden and on the n. by Arabia, the Red Sea and Erythrea. The protectorate covers an area of almost 45,000 square miles. The interior is a plateau, having an elevation of about 4000 feet. There are no industries of note, but the trade is of some importance, owing to the sea fisheries. The chief imports are cotton and silk goods, food stuffs and tobacco, and the exports include coffee, ivory and gold, most of which are sent to France. The principal towns are Jibouti, the seat of the colonial administration; Obok; Tajurah, and Ambado. The government of the country is in the hands of the governor and a general council of six members, three being chosen from the government officials and three from the residents. The population of the protectorate is 22,000, and with the dependencies it is estimated at 200,000.

**Frenchtown**, BATTLE OF. See RAISIN RIVER, MASSACRE OF

**French West Africa**, a governor-generalship of France, including practically all of the Sahara, according to the decree of Oct. 17, 1899. It also comprises Senegal, the three military territories of French Sudan, French Guinea, the Ivory Coast and South Dahomey. Saint Louis, in Senegal, is the seat of the governor-general.

**Freneau**, *fre no'*, PHILIP (1752-1832), an American poet. At Princeton he was acquainted with James Madison. Captured by a British cruiser in 1780, he gave in *The British Prison Ship*, a long poem, an account of his experiences in captivity. As editor of the *National Gazette*, his violent attacks on the Federalists aroused Hamilton's anger. His poems were numerous and comprise, among many satires, some beautiful lyrics, which show Freneau to have been a true poet.

## Fresno

**Frere**, *frair*, HENRY BARTLE EDWARD, Sir (1815-1884), a British diplomat. In 1834 he entered the Indian service and by 1860 had risen to the position of chief commissioner of Sindh. In 1862 he was made governor of Bombay; ten years later he was sent to East Africa as special commissioner and distinguished himself by procuring from the sultan of Zanzibar a promise to abolish the slave trade. For three years following 1877 he was governor of Cape Colony.

**Fres'co** or **Fresco Painting**, a method of mural painting in water colors on fresh or wet grounds of lime or gypsum. Mineral or earthy pigments are employed, which resist the chemical action of lime. In producing fresco paintings, a finished drawing on paper, called a cartoon, exactly the size of the intended picture, is first made, to serve as a model. The artist then has a limited portion of the wall covered over with a fine sort of plaster, and upon this he traces from his cartoon the part of the design suited for the space. As it is necessary to the success and permanency of his work that the colors should be applied while the plaster is yet damp, no more of the surface is plastered at one time than the artist can finish in one day. A portion of the picture once commenced needs to be completely finished before leaving it, as fresco does not admit of retouching after the plaster has become dry. On completing a day's work, the artist removes any unpainted part of the plaster, cutting it neatly along the outline or other definite form, so that the joining of the plaster for the next day's work may be concealed. The art is very ancient, specimens of it being found in India, Egypt, Mexico, Pompeii and other places. After the beginning of the fifteenth century fresco painting became the favorite method of the greatest Italian masters, and many of the great works of such artists as Michelangelo, Raphael and Fra Angelico are frescoes on the walls of palaces and churches. Some ancient wall paintings are executed in what is called *dry fresco*, or *tempera*, which is different from the true fresco in that it is executed on dry plaster, which is moistened with lime water before the colors are applied. Fresco painting has in recent years again been revived.

**Fres'no**, CAL., the county-seat of Fresno co., 207 mi. s. e. of San Francisco, on the Southern Pacific and the Atchison, Topeka & Santa Fé railroads. The city is in an agricultural and stock-raising district. It exports enormous quantities of raisins, wines, brandies, grapes, oranges, olives and other fruits, also wheat, sheep and



## Frey

horses. Fresno has a Carnegie library and a fine Federal building. The place was settled in 1872 and became the county-seat two years later. Population in 1910, 24,892.

**Frey**, *fri*, in Scandinavian mythology, the god of sunshine, of pleasure and of fruitfulness. The other gods, by whom Frey was much beloved, made him various presents, among which was a magic sword, which would fight by itself the moment it was drawn from its scabbard; a ship which, while it was large enough to carry all of the gods and their attendants, could be folded up at will like a napkin; and a boar with golden bristles, on which Frey rode over land and sea with incredible swiftness. Frey fell in love with Gerda, and to obtain the assistance of his servant in gaining Gerda as his wife he was obliged to give up his wonderful sword, which was greatly missed afterwards in all combats of the gods.

**Freya**, *fri'ah*, in Scandinavian mythology, the sister of Frey and the goddess of love and beauty, corresponding to the Venus of the Greeks and the Romans. The conception of her differs somewhat from the classical conception of Venus, as she was regarded to some extent as a war goddess and often accompanied the valkyries when they flew down to the battlefields to carry away the slain warriors. Half of the heroes slain belonged to Freya, and she entertained them sumptuously in her palace.

**Freycinet**, *fra se nay'*, CHARLES LOUIS DE SAULCES DE (1828- ), a French statesman. He served ably in various positions under the government before his appointment in 1870 as associate to Gambetta in the department of war. After serving as minister of public works, he became premier under President Grévy, but held office less than a year. In 1882 he again formed a cabinet, which remained in office, however, only a few months. In 1886 he was premier a third time, from 1888 to 1893 was minister of war and from 1890 to 1892 was premier for the fourth time. Later he held various offices and was made a member of the French Academy.

**Freytag**, *fri'tahK*, GUSTAV (1816-1895), a German dramatist and novelist. He is best known in this country for an excellent novel, called in its translation *Debit and Credit*, and for his *Technique of the Drama*. His other works, however, are numerous, and most of them have been highly successful.

**Fri'ar**. See MONACHISM.

**Friction**, in mechanics, the resistance offered to the movement of one body by another, when

## Frigate Bird

their surfaces are in contact. Friction is due to adhesion and to the roughness of the surfaces. It is of two kinds, *sliding* and *rolling*. The first is illustrated by the sliding of a sled or the working of a piston in a pump or engine; the second by the friction of car wheels on a track. When the pressure is equal, friction is greater between rough surfaces than smooth ones. It is usually greater between soft than between hard surfaces, as the friction of oak on oak is greater than that of iron on iron. Friction is lessened by the use of lubricants, such as oil and graphite. These fill up the cavities in the surface and make it smoother, and they also prevent heat. It is for the purpose of relieving friction that oil is used about machinery.

**Friday**, the sixth day of the week, the Mohammedan Sabbath, or day of assembly. In the Roman, Anglican and Greek churches Fridays are considered days of general fasts or obligation.

**Friendly Islands**. See TONGA ISLANDS.

**Friendly Societies**. See FRATERNAL SOCIETIES.

**Friends**, SOCIETY OF. See QUAKERS.

**Frig'ate**, among ships of war of the older class, a vessel of a size larger than a sloop or a brig and less than a ship of the line; usually carrying her guns on the main deck and on a raised quarter-deck and forecastle, or having two decks. Such ships were often fast sailers and were much employed as cruisers in the great wars of the eighteenth century and early part of the nineteenth. Since the introduction of iron-clad vessels, the term frigate has been applied to war ships having a high speed and great fighting power.

**Frigate Bird** or **Man-of-war Bird**, a tropical web-footed bird, related to the pelican. It



FRIGATE BIRD

takes its name from the savage attacks it makes upon gulls and other birds, when they are carrying their prey. In flight the frigate bird is power-

## Frigga

ful and graceful, and its prey is taken upon the wing. It nests in large colonies on rocky cliffs or in low shrubs or trees. In the breeding season the pouch under the male's bill becomes a bright scarlet, and as he fills this with air from time to time, it puffs out round and full and reaches to the tip of his beak, which is about five inches long.

**Frig'ga** or **Frigg**, in northern mythology, the wife of the god Odin and the highest of the goddesses, corresponding in some respects to Juno in classical mythology. She is often confounded with Freya, who, however, is more like Venus. It is probable that Friday was named for Frigga.

**Fringe Tree**, a small tree belonging to the same natural family as the olive, and having snow-white flowers, which hang down like a fringe. It is native to America and Asia. The common fringe tree of America is frequently cultivated in gardens as an ornamental plant and grows to a height of eight feet. Four other species are known, two of which inhabit the West Indies, the third, Ceylon, and the fourth, Australia.

**Frith**, **WILLIAM POWELL** (1819-1909), an English painter, born at Studley, near Ripon. He was commissioned by the queen to paint the marriage scene of the Prince of Wales. In 1852 he was elected a member of the Royal Academy and afterward was made a member of several foreign academics. Large engravings have been produced from a number of his pictures. Some of his pictures are *Malvolio Before the Countess Olivia*, *Village Pastor*, *Marriage of the Prince of Wales* and *Derby Day*.

**Fro'bel**, **FRIEDRICH WILHELM AUGUST**. See **FROEBEL**, **FRIEDRICH WILHELM AUGUST**.

**Fro'bisher**, **MARTIN**, Sir (1535-1594), one of the greatest Elizabethan navigators. He made three expeditions to the Arctic regions, for the purpose of discovering a northwest passage to India, and unsuccessfully attempted to found a settlement north of Hudson Bay. He took part in numerous later expeditions against Spain and was killed in an attack at Brest.

**Froebel**, *frö'bel*, **FRIEDRICH WILHELM AUGUST** (1782-1852), a German educator, founder of the kindergarten system of instruction. He was the son of a Lutheran minister and during his boyhood and youth obtained only a limited education. He learned forestry, but was not successful and began teaching in a model school at Frankfort-on-the-Main in 1803. Four years later he joined Pestalozzi at Yverdon, where he remained three years studying Pestalozzi's

## Frog

methods. After this he studied at the universities of Göttingen and Berlin. He enlisted in the volunteer movement against Napoleon, and after that he founded the celebrated school at Keilhau, where he wrought out his system of instruction during the fifteen years that he remained with the institution. Doctor Painter, in his *History of Education*, summarizes the fundamental ideas of Froebel's system as follows:

"1. The task of education is to assist natural development towards its end. As the child's development begins with its first breath, so must its education also.

"2. As the beginning gives a bias to the whole after-development, so the early beginnings of education are of most importance.

"3. The spiritual and physical development do not go on separately in childhood, but the two are closely bound up with each other.

"4. Early education must deal directly with the physical development and influence the spiritual development through the exercise of the senses.

"5. The right mode of procedure in the exercise of these organs is indicated by nature in the utterances of the child's instincts, and through these alone can a natural basis of education be found.

"6. The instincts of the child, as a being destined to become responsible, express not only physical but spiritual wants. Education is to satisfy both.

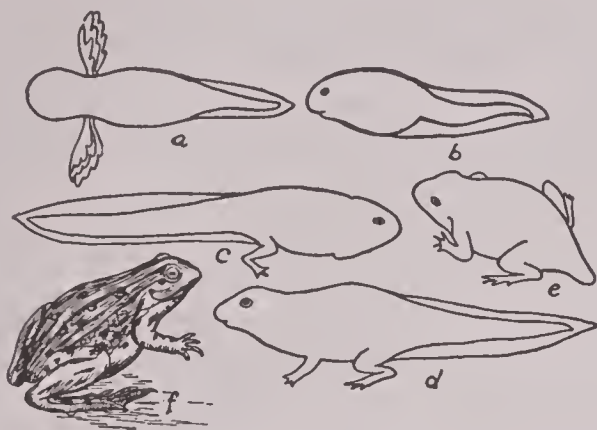
"7. The development of the limbs by means of movement is the first that takes place and therefore claims our first attention.

"8. Physical impressions at the beginning of life are the only possible medium for awakening the child's soul. These impressions should therefore be regulated as systematically as the care of the body and should not be left to chance." See **KINDERGARTEN**.

**Frog**, a little tailless animal, common in all parts of the world except Australia and South America. There are many species, and they inhabit widely different regions, but usually prefer swampy places and the shores of lakes and streams. The young frog, which is known as the tadpole, has no resemblance to the parent. It has neither mouth nor limbs, but has branching gills and a long tail, with which it swims about. Its body looks like a roundish lump of dark jelly. But soon the mouth develops, the gills disappear and, as the days go on, the hind legs appear. The fore legs follow, the tail is gradually absorbed and thus the animal changes.



or develops, into the frog. It is an interesting transformation which any one may observe, if he will keep a few of the tadpoles where he can see them daily. The mature frogs breathe by lungs and cannot live in water without coming to the surface for air. They swim with great rapidity and move by long leaps, being able to



DEVELOPMENT OF A FROG

*a, b, c, d, e and f* show the successive stages of development.

jump many times their own length. In the tadpole stage, frogs live chiefly on vegetable matter, but the mature frog lives on insects, slugs, snails and the like. The flesh, especially that of the hind legs of certain species, is considered very choice food, and in France, particularly, frogs are bred for the market in large numbers.

**Frohman**, CHARLES (1860– ), an American theatrical manager, born at Sandusky. He was educated in the public schools of New York City, but soon became interested in the production of plays. His first success was the management of *Shenandoah*, the rights of which he bought after seeing the presentation of the play at Boston. Afterward he organized a stock company and gained control of the Empire theater, the Criterion, the Museum, the Garrick, the Savoy, the Madison Square, the Knickerbocker and the Garden theater in New York City, besides the Duke of York theater in London. He is a prominent figure in the so-called theatrical trust of the United States, which controls the services of some of the foremost actors of the time. He has been instrumental in bringing forward many well-known American actors, among whom are Maude Adams, Julia Marlowe and John Drew.

**Froissart**, *frwah sahr'*, JEAN (about 1338–about 1410), French poet and historian. He received a liberal education and took orders in the Church, but his inclination was always toward poetry and tales of chivalry. From 1361

to 1366 he was secretary to Philippa, queen of England, whose favor he had won by his poetry. After the death of Philippa he became curé of Lestines, and during his quiet life there he worked at his *Chronicles*. After many uneventful years, he again began his travels and journeyed to many parts of the world, visiting famous men and receiving their accounts of wars and expeditions in which they had engaged. Little is known of the closing part of his life. His great work is the *Chronicles*, in the four books of which he told in a vivid manner of the wars and other events of the fourteenth century.

**Fronde**, *frôhNd*, the name given to a struggle which took place in France between 1648 and 1653. It was directed against Mazarin and consisted of two distinct movements, the first, an attempt of the Parlement of Paris to limit the royal authority; the second, an ambitious attempt of the great nobles to gain power. In order to curb the royal authority the Parlement refused to register certain objectionable edicts in regard to taxation, and when Mazarin arrested two members of the Parlement, an insurrection arose which forced the court to agree to demands of the Parlement. By the following year the court party felt strong enough to withdraw the concessions made, and in the war which now broke out, Parlement had the aid of some of the great nobles of the State. The nobles were for the most part successful, but as they had no definite program laid down, they allowed their gains to slip through their fingers, and Mazarin was able to regain his old power.

**Frontenac**, *frôhNt nak'*, LOUIS DE BAUDE, Comte de (about 1620–1698), a French soldier, one of the early governors of New France in America. He had served with distinction in Italy, Flanders and Germany before he was made governor of New France in 1672. The explorers Joliet, Marquette and La Salle were encouraged by him, and he established a number of strong military posts. Despite the fact that New France prospered under his rule, he was recalled in 1680, but nine years later he was reinstated. During this second administration, he was engaged in a struggle with the Iroquois Indians of New York, whom in 1696 he compelled to sue for peace. During King William's War with the English, he succeeded in forcing the English fleet to retreat from before Quebec in 1690.

**Frost**, the name given to the state of the weather when the temperature is below the freezing point of water; also the name given

## Frostbite

to the moisture condensed from the atmosphere, when the dew point is below 32° F. Frost is often very destructive to vegetation, owing to the fact that water, which is generally the chief constituent of the juices of the plants, expands, when freezing, and bursts, thus destroying the minute cells of the plant. In the same way, rain water, freezing in the crevices of rocks, breaks up their surfaces and often detaches large fragments. Frost is not frozen dew, but vapor frozen as it condenses. It is generally seen most profusely in spring and autumn, because at those times, while, on clear nights, the cold is sufficient to freeze the vapor, the days are at the same time sufficiently warm to cause a very considerable quantity of moisture to evaporate into the air. See DEW.

**Frostbite**, a term applied to the effect of severe cold on the human body. It is generally local and partial, varying from ordinary chilblain to complete death of the part frozen. The simplest treatment of light frostbite consists in coaxing back the vitality of the part affected by means of gentle rubbing with snow, ice or cold water. The return of blood brings heat and fever, which may be very severe if the return is sudden. Hence, cold applications should be used before warm ones. If the freezing has been very severe or long-continued, the parts may die, decay and slough off. In such cases prompt skilled treatment is necessary.

**Frostburg**, MD., a town in Allegheny co., 163 mi. s. e. of Pittsburg, Pa., on the Cumberland & Pennsylvania railroad. It has a picturesque location 2200 feet above the level of the sea and has become a popular summer resort. Coal mining is the chief occupation, and there are also large foundries, planing mills and fire-brick yards. Population in 1910, 6028.

**Froude**, *frood*, JAMES ANTHONY (1818-1894), an English historian and miscellaneous writer. He was educated at Westminster School and at Oxford and after his graduation became engaged in the Tractarian movement (See TRACTARIANISM), as advocated by Newman. He even took orders in the Church, but resigned before long and gave himself up to historical study. Between the years 1856 and 1869 appeared his great work, *The History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*, which was very popular, but received only doubtful approval from historians. He was elected rector of Saint Andrews University in 1869, traveled in the United States in 1872 and aroused considerable opposition by his

## Frye

lectures on the Irish question. Later he traveled in South Africa, Australia and the West Indies and gave accounts of his journey in lectures and books. Carlyle appointed Froude his literary executor, and after Carlyle's death Froude published *The Reminiscences of Carlyle, Letters and Memorials of Jane Welsh Carlyle and Thomas Carlyle: a History*. These provoked an extraordinary amount of interest and controversy, because of the unreserved accounts they gave of the life of the Carlyles. Among Froude's other works are *The English in Ireland in the Eighteenth Century*, *Life of Lord Beaconsfield* and *Life and Letters of Erasmus*.

**Fruits**, *fruits*, in botany, the mature ovary, composed of the seed of a plant and its coverings. In a more general sense, the term is applied to the edible products of certain plants, generally covering and including their seeds. On the accompanying color plate may be seen a number of the familiar fruits of the United States, all but three of which, the loquat, the orange and the lemon, are raised more extensively in the more temperate parts of the country. These, together with the banana and some other subtropical fruits, are raised in abundance in California and Florida. The value of these products in the United States is constantly increasing, and fruit raising is in many sections of the country the most important industry. The really valuable fruits of the United States are described under their appropriate titles elsewhere in the work.

**Fry**, ELIZABETH GURNEY (1780-1845), an English reformer. She joined the Society of Friends and in 1811 began preaching. Her great public work began in 1817, with the formation of the society for the improvement of women prisoners in Newgate. Largely through her exertions the condition of these prisoners was greatly improved. She visited the prisons of Scotland and northern England and founded several prison associations. The House of Commons took official notice of her work, commending it in the highest terms.

**Frye**, WILLIAM PIERCE (1831-1911), an American lawyer and statesman, born at Lewiston, Me., and educated at Bowdoin College. He entered the legal profession and was also a member of the state legislature in 1861-1862 and again in 1867. Meantime, he served as mayor of the city. He was attorney-general of the state (1867-1869), was chosen to Congress for six terms and was elected senator to take the place of James G. Blaine in 1881. In 1898 he



## Fuca

was appointed by President McKinley one of the five commissioners to negotiate the treaty of peace with Spain. After the death of President McKinley and the consequent accession of the vice-president to the presidency, Mr. Frye filled the position of president *pro tempore* of the Senate.

**Fuca, Juan de**, *foo'kah, wahn da*, STRAIT OF, the strait between Vancouver Island and Washington, on the Pacific coast. It connects the Pacific Ocean with the Strait of Georgia on the north and Puget Sound on the south. Its length is 100 miles and its width 15 miles in the western part and 30 in the east.

**Fu-chow** or **Foo-chow**, a city of China, capital of the province of Fokien, on the Min River, 125 mi. n. e. of Amoy. A long bridge, called the "Bridge of Ten Thousand Ages," crosses the river here. It is one of the five ports thrown open by the treaty of 1843. The trade is very extensive, but the navigation of the river from the sea to the harbor is difficult. Fu-chow has a large arsenal, government shipyards and dry dock. Among the manufactures are cotton goods, matches and lacquer ware. Population, estimated at 700,000.

**Fuchsia**, *fu'she ah*, a genus of beautiful flowering shrubs, named after the discoverer, Leonard Fuchs, a German botanist. There are about fifty species, natives of South America, Mexico and New Zealand. The plant bears beautiful flowers that droop gracefully from the branches. Fuchsias are often called *ladies' earrings* and are a popular garden plant in the United States and Europe.

**Fuel**, a substance used for feeding fire. Fuels are divided into three classes, solids, liquids and gases. The most important solid fuels are coal, coke, charcoal and wood. In the United States and Great Britain coal and coke are the most extensively used, but in countries having large forests, wood is the common fuel. The liquid fuels are petroleum, kerosene, gasoline, various oils and alcohol. Peat is also used as a fuel to some extent in countries where it is formed, particularly in Ireland. Wood charcoal is another kind of fuel which is extensively used in metallurgy, chemistry and various industrial arts. It kindles quickly, emits few watery or other vapors while burning and, when consumed, leaves few ashes. These, being light, are easily blown away, so that the fire continues open to the current of air which must pass through it to keep it burning. This sort of fuel, too, is capable of pro-

## Fujiyama

ducing as intense a heat as can be obtained by any; but in violent heats it is quickly consumed and needs to be frequently supplied. Coke or pit-coal, charred, is a fuel which possesses in many respects the same properties as charcoal of wood. It is employed for producing intense melting heats. Various kinds of artificial fuel are manufactured. These are composed of different ingredients, of which coal slack, or dust, is the most important. The coal dust is mixed with some adhesive substance, such as clay, lime or coal tar, and is compressed into bricks, called *briquettes*. Coal slack has also been employed as fuel in an entirely different mode. It is ground as fine as possible and blown into the furnace, where it burns much in the same way as the spray of liquid fuel. See CHARCOAL; COAL; COKE; NATURAL GAS; PEAT; PETROLEUM.

**Fugitive Slave Laws**, in United States history, two statutes providing for the return of slaves who had escaped from one state to another. Most of the colonies had laws guaranteeing the return of fugitive slaves. The Ordinance of 1787 contained a clause to that effect, and the Constitution specified that slaves escaping into a free state should be delivered to their owners. Congress in 1793 passed an act allowing the owner of a slave, by making an affidavit before a Federal judge, to secure a warrant for his arrest and removal. The slave could not testify in his own behalf. The abuses of this law led to a demand on the part of Northerners for an amendment requiring more evidence for the granting of a warrant, and this led to the passage of personal liberty laws by many Northern states, forbidding state officials to help in reclaiming alleged fugitives. These laws were declared constitutional by the Supreme Court. In 1850, among the compromise measures passed (See COMPROMISE OF 1850) was a fugitive slave law, placing in the hands of Federal officials the whole process of reclaiming fugitive slaves, adding many officials to the service, inflicting severe penalties for violation and declaring bystanders who refused to assist a government official guilty of treason. The owner's oath was sufficient evidence, and he could take this oath before a court in his own state. The passage of this law was one of the most important incidents in the slavery controversy which led to the Civil War.

**Fujiyama**, *foo'je yah'mah*, or **Fusiyama**, a dormant volcano, of a cone-like shape, in the island of Hondo, Japan, 60 mi. w. of Tokyo

## Fulah

It is the highest summit in Japan, measuring 12,400 feet, and is the sacred mountain of the people. It has been quiescent since 1707. It is visible in clear weather for nearly a hundred miles.

**Fulah**, *foo'lah*, a remarkable African race, of the negro type, now widely diffused throughout the Sudan, where they are the predominant people in many provinces. Though of the negro family, they have neither the deep jet color, the crisped hair, flat nose nor thick lips of the negro, but are decidedly handsome and generally of a light copper color. They are shrewd, intelligent and brave and are chiefly Moham-medans. Their name appears in various forms in different tribes.

**Ful'gurite**, any rocky substance which has been fused or made into an impure glass by lightning. More strictly, a vitrified tube of sand, formed by lightning, whose intense heat has penetrated the sand and fused the portion of the materials through which it passes.

**Full'er**, MARGARET. See OSSOLI, SARAH MARGARET FULLER.

**Fuller**, MELVILLE WESTON (1833-1910), an American jurist, born in Augusta, Me. At the age of twenty he graduated at Bowdoin College. He studied law at Harvard and was admitted to the bar in his native city in 1855. He became editor of the *Augusta Age*, but in 1856 moved to Chicago, where he practiced law for thirty-two years. In 1862 he was a member of the Illinois constitutional convention, and the following year he was elected to the state legislature. He was a member of the Democratic national conventions from 1864 to 1880, inclusive, but withdrew from active politics in the latter year. On April 30, 1888, he was nominated chief justice of the United States Supreme Court by President Cleveland and served twenty-two years with dignity and ability. In 1899 he was one of the arbitrators of the Anglo-Venezuelan dispute.

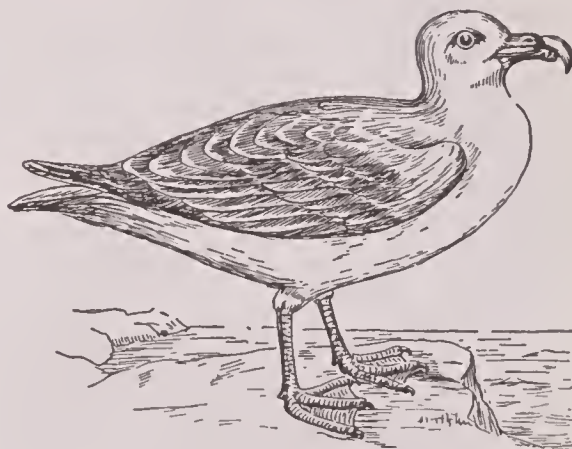
**Fuller**, THOMAS (1608-1661), an eminent historian and divine of the Church of England. Several of his writings are English classics, remarkable for quaintness of style, wit, sagacity and learning. Among the more important are *History of the Holy War*, *Church History of Britain* and the *Worthies of England*, a production valuable alike for the solid information it affords, relative to the provincial history of the country, and for the profusion of biographical anecdote and acute observation on men and manners.

## Fulmination

**Fuller's Earth**, a variety of clay or marl, compact but friable, soapy to the touch and of various colors, usually with a shade of green. It is useful in scouring and cleansing cloth, as it absorbs the grease and oil used in preparing wool. It is composed of silica, alumina, magnesia, lime and water.

**Fulling Mill**, a mill for fulling cloth by means of pestles, or stampers, which beat or press it to a close or compact state and at the same time cleanse it by the use of fuller's earth and soap. The principal parts of a fulling mill are the wheel, the spindle, the pestles, or stampers, and the trough. The spindle contains teeth, which, as the spindle is revolved, communicate the motion to the pestles, or stampers. The cloth is placed in the trough with fuller's earth and soap and water.

**Ful'mar**, the name of several species of petrels. The common northern fulmar inhabits the northern seas and is found plentifully on the shores of the Faroe Islands, Iceland and



FULMAR

Greenland, on the southern shores of Great Britain and around Saint Kilda. It is about the size of a duck, is gray above and white beneath, with snow-white head, neck and tail. The birds are especially valuable for their feathers and also for their oil, which forms an important commercial product. Fulmars are caught by hunters, who make perilous descents by ropes from the summit of precipices. The giant fulmar, remarkable for its size, is found in the Pacific Ocean. Another species, the slender-billed fulmar, is found on the Alaskan coast of Bering Sea. See PETREL.

**Fulmina'tion**, a term used in chemistry to denote the explosion of a substance by heat or percussion. Fulminating compounds, or fulminates, are explosive compounds of fulminic acid with various bases, such as gold, mercury, platinum and silver. The old fulminating pow-



## Fulton

der is a mixture of sulphur, niter and potash. Fulminate of mercury forms the priming of percussion caps.

**Fulton**, *full'ton*, N. Y., a city in Oswego co., 25 mi. n. w. of Syracuse, on the Oswego River, the Oswego Canal and the New York Central, the Lackawanna and other railroads. It has a large cheese trade and considerable manufactures of paper, woolens, flour, machinery and other articles. It was settled about 1791. Population in 1910, 10,480.

**Fulton**, ROBERT (1765-1815), an American engineer, born at Little Britain, Pa., who claimed to be the introducer of steam navigation on American waters. He adopted the profession



ROBERT FULTON

of portrait and landscape painter and in his twenty-second year proceeded to England for the purpose of studying art under West. There he became acquainted with the duke of Bridgewater, Earl Stanhope and James Watt and was led to devote himself to mechanical engineering. In 1794 he took a patent for a double-inclined plane, which was intended to supersede locks on canals, and he also patented a mill for sawing marble, machines for spinning flax and making ropes, and a dredging machine. In 1797 he went to Paris, where he produced the first panorama that was exhibited there. He also, after some trials, was successful in intro-

## Fungi

ducing a boat propelled by steam upon the Seine. His chief occupation in Paris was the invention of torpedoes for naval warfare. During a visit to Scotland he had seen and obtained drawings of the *Charlotte Dundas*, a steam vessel which had plied with success on the Forth and Clyde Canal. He returned to America in 1806 and built a steamboat, the *Clermont*, of considerable dimensions, which began to navigate the Hudson River in 1807. Its progress through the water at the time was five miles an hour. His reputation as an engineer and inventor was now firmly established, and he was employed by the United States government on various engineering works. In 1814 he constructed the first war steamship and was engaged upon an improvement of his submarine torpedo when he died. See STEAM-BOAT.

**Funchal**, *fooN shahl'*, the capital of the island of Madeira, situated on a bay on the south coast. It stretches for nearly a mile along the shore and presents a thoroughly European appearance. It is a coaling station for steamers and is visited by invalids afflicted with pulmonary complaints. Population, about 19,000.

**Function**, in mathematics, a quantity so connected with another that no change can be made in the latter without producing a corresponding change in the former, in which case the dependent quantity is said to be a *function* of the other; thus, the circumference of a circle is a *function* of the diameter, the area of a triangle is a *function* of any two of the sides and the angle they contain.

**Fundy**, BAY OF, a large inlet of the Atlantic, on the east coast of North America, separating Nova Scotia from New Brunswick. It is about 100 miles long and 30 to 50 miles wide. At its inner extremity it divides into Chignecto Bay and Minas Channel and Basin, with smaller continuations. It is noted for its impetuous tides, which cause a rise and fall of from 12 to 70 feet and make navigation dangerous. At its entrance are Grand Manan and other islands. This bay receives the Saint John and Saint Croix rivers.

**Fungi**, *fun'ji*, a general name for those flowerless plants that have no chlorophyll in their tissues and hence are unable to live independently, but must prey upon other plants or animals. The number of different species is enormous. Perhaps 50,000 have been described, and it is probable that this is not more than







# FUR-BEARING ANIMALS OF NORTH AMERICA

1, Brown Bear  
2, Squirrel

3, Lynx  
4, Sable

5, Seal  
6, Ermine

7, Otter  
8, Beaver

9, Silver Fox  
10, Mink

## Fungicides

one-third of the entire number. They grow wherever they can find organic matter on which to subsist and are to be found floating in the air at all times, living in exposed water and inhabiting the soil everywhere. Some species are beneficial to man, but others are intensely destructive. See BACTERIA AND BACTERIOLOGY; RUSTS; MILDEWS; YEASTS; MUSHROOMS.

**Fungicides**, *fun'jy sidez*. See INSECTICIDES.

**Funs'ton**, FREDERICK (1865-1917), an American soldier, born in Ohio. He graduated from the high school at Iola, Kan., and after teaching a short time entered the state university at Lawrence. He made important researches in botany and was appointed in 1895 as a commissioner to explore Alaska and report on the flora of the country. In 1896 he took part with the insurgents in Cuba under General Garcia. When the Spanish War began, he became colonel of the Twentieth Kansas volunteers and was ordered to Manila. He was made brigadier general of volunteers for bravery. In March, 1901, he led a party into northern Luzon and captured Aguinaldo, the leader of the insurgents. For this achievement President McKinley made him a brigadier general in the regular army. At the time of the San Francisco earthquake and fire in April, 1906, he had charge of the military forces in the city. In 1914 he was in command of the United States troops at Vera Cruz, Mexico, and was made major-general the same year. In 1916 he was placed in command of the troops along the Mexican border.

**Fur and Fur Trade**. Fur is the fine, soft hair covering of certain animals, especially the winter covering of animals belonging to northern latitudes. The animals chiefly sought after for the sake of their furs are the otter, seal, beaver, marten, ermine, muskrat, mink, lynx, fox, bear and wolf (see *color plate* opposite). All the preparation that skins require before being sent to the market is a thorough drying, so that they will not spoil. The small skins, however, are sometimes steeped in a solution of alum before drying. When stored in large quantities they must be carefully preserved from dampness, as well as from moths. The furdresser, on receiving the skins, softens them, scrapes off the pieces of flesh that may remain, and cleans them thoroughly. Then, after the fur has been combed, the skin is ready for the cutter.

Russia yields great quantities of furs, especially in the Asiatic portion of her dominions.

## Furies

Austria, Turkey and Scandinavia produce the greater part of the balance of European furs. The fur trade of America has long been highly important and has given rise to several great trading companies. The French early took up the fur trade in Canada, and their chain of forts and trading posts at one time extended from Hudson Bay to New Orleans. Quebec and Montreal were at first trading posts. In 1670 Charles II granted to Prince Rupert and others a charter empowering them exclusively to trade with the Indians of the Hudson Bay region. A company, then and after called the Hudson's Bay Company, was formed, which for a period of nearly two centuries possessed a monopoly of the fur trade in the vast tract of country known as the Hudson Bay Territory. In the winter of 1783-1784 another company was formed at Montreal, called the Northwest Fur Company, which disputed the right of the Hudson's Bay Company and actively opposed it. After a long and bitter rivalry the two companies united in 1821, retaining the name of Hudson's Bay Company. The monopoly which had hitherto been enjoyed by the original company about Hudson Bay was not much extended; but in 1868 an act of Parliament was passed to make provision for the surrender, upon certain terms, of all the territories belonging to the company and for their incorporation with the Dominion of Canada. In 1869 the surrender was carried out, Canada paying \$1,500,000 to the company by way of compensation. The trade in furs conducted by citizens of the United States has been extensive, but it has been in a greater degree the result of individual enterprise than of the management of gigantic corporations. The Alaska Fur Company holds two of the Aleutian Islands in lease from the government, with the sole right of killing yearly not more than 100,000 fur seals. New York is the most important fur market in the United States, and London and Leipzig are the most important European markets.

**Fu'ries**, known also as the Eumenides or the Erinyes, in Greek mythology, certain deities who avenged such crimes as murder, perjury or filial ingratitude. It was generally believed that there were three of these goddesses, though Aeschylus in his tragedy of the *Eumenides* introduced many more. These terrible sisters pursued all criminals who had escaped from the law and drove them mad with remorse. So great was the fear of them that the ancients did not dare speak of them as the Erinyes,



## Furlong

which meant *the angry goddesses*, but used the name *Eumenides*, *gracious ones*, in order to pacify them.

**Fur'long**, (furrow-length), an English measure of length, divided into 40 rods, poles or perches, and equal to 220 yards, the eighth part of a mile.

**Furnace**, a device for maintaining a very hot fire. Furnaces are used for smelting ore, making glass, baking pottery, warming buildings and other purposes. Those employed in smelting have an arrangement by which a strong draft of air is forced through the fire; these furnaces are known as blast furnaces (See **BLAST FURNACE**). A *reverberatory* furnace is one in which the flames, in passing to the chimney, are thrown down by a low arched roof upon the object which it is intended to heat. These furnaces are used in the manufacture of wrought iron and steel (See **IRON**). The ordinary furnace used for warming buildings is practically a large stove, enclosed in a jacket. The air is admitted to the jacket near the ground, and as it rises is warmed by coming in contact with the furnace. It passes out through pipes at the top and is conveyed to different parts of the building. See **HEATING; VENTILATION**.

**Furieux**, *fur no'*, **Islands**, a group of Australasia, at the east end of Bass Strait, including Flinders Island, the largest, 35 miles long and 10 miles wide; Cape Barren Island, Clarke, Hummock and Babel islands. They were discovered by Furieux in 1773.

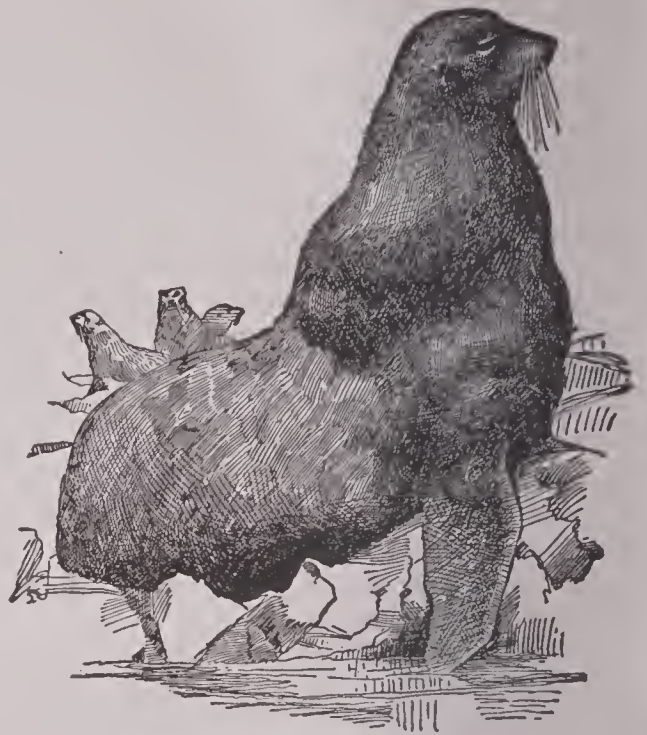
**Fur'ness**, HORACE HOWARD (1833-1912), an American Shakespearean scholar. He was born in Philadelphia and educated at Harvard and at Halle in Germany. After studying law, he was admitted to the bar in 1859. The work for which he is best known is his *Variorum Shakespeare*, which has been universally recognized as an important and scholarly work.

**Fur'nivall**, FREDERICK JAMES (1825-1910), an English philologist. He has been mainly instrumental in establishing the Early English Text Society, the Chaucer Society, the New Shakespeare Society, the Browning Society, the Wyclif Society and the Shelley Society. He has edited numerous works, chiefly through the medium of some of these societies, among which is the famous Six-Text edition of Chaucer's *Canterbury Tales*. He has been closely connected with various editions of Shakespeare's plays.

**Fur Seal**, a species of seal much valued for its fur, which consists of a thick, woolly hair next

## Fur Seal

the skin, very fine and compact, and usually of a dark brown color. Over this grows long, coarse hair, which is of some shade of gray. The fur seals are found in the waters of the cool temperate or polar regions north and south of the equator, though in the Antarctic regions they are now almost extinct.



FUR SEAL

One herd of seals, which constitutes a distinct species, and that the most important of all the seals, makes its home on the Pribilof Islands, a barren little group in Bering Sea. The study of these animals and their habits, as exhibited on Saint Paul and Saint George, the two largest islands, has been as fascinating to men of science as their capture has been profitable to traders. Every spring the seals return by thousands to this chosen home, and many of them have specially favored places which they seize each year, and for which they will fight to the death. Each old male, or bull, gathers about him a large number of females, sometimes as many as one hundred, whom he defends against the other bulls, and from whom he exacts the strictest obedience. Through all the long period from spring until August the bulls fast, but the mothers, soon after the young seals, or pups, are born, swim away to the south to find food. The little seals are thus left sometimes for a week, but when the mothers return each is able to distinguish her own pup from all the others of the great group. The pup, too, can tell its own mother's voice, though hundreds or thousands of others may be calling at the same time.

## Furth

When winter comes, and the storms begin, the seals depart for the south, often going down as far as Lower California; but nowhere do they land and establish a home until with the spring they return to the Pribilof Islands.

The full-grown male fur seal is almost as large as a bear, being often twice as long and weighing four or five times as much as the female. It is the young males which are killed for their fur, for they are the least necessary part of the colony, as the old bulls will not allow them to set up families until they are seven or eight years old, at least. The killing of seals on the Pribilof Islands is carefully regulated by the United States government and only a small number may be killed each year; but in spite of care the number has steadily lessened, and in 1910 killing was forbidden for a period of five years. There are other seal breeding grounds, or rookeries, on other groups of islands, but none are as large or as important as the one on the Pribilof Islands.

The animals are killed by clubbing them when they are on land, where they are comparatively helpless. The skins are salted and packed in the holds of vessels until the close of the season. The beautiful fur is seldom seen in its natural state. As usually prepared, the long gray hair is removed by scraping the pelt on the under side until the roots of this hair, which penetrate the skin farther than those of the fine hair, are cut; then by whipping the pelt the long hair is easily removed. The skins are then dyed dark brown or almost black, and in this form constitute the ordinary sealskin of commerce.

**Furth**, *furt*, a town in Bavaria, 6 mi. w. n. w. of Nuremberg, at the confluence of the Pegnitz with the Rednitz. Its chief buildings are the Church of Saint Michael and a town hall. It has important and varied manufactures, including mirrors, picture frames, jewelry, gold leaf, lead pencils, spectacles and machinery. Population in 1910, 66,553.

## Fusiyama

**Fuse**, a tube filled with combustible matter and used in blasting, discharging hollow projectiles and exploding mines. The ordinary fuse used in mining and quarrying is a small tarred cord, containing in its center a small quantity of gunpowder or other very combustible material, so mixed with chemicals that it burns slowly. When the fire reaches the charge of powder, the explosion immediately follows. Fuses used in hollow projectiles explode when the projectile strikes the object against which it was fired. These are known as *concussion* fuses. Such fuses are found in shells and torpedoes. Some patterns of torpedo contain a mechanical fuse, which is timed to produce an explosion at the end of the number of seconds it is estimated it will take the torpedo to reach the object against which it is fired. See **TORPEDO**.

**Fu'sel Oil**, a heavy, oily, inflammable fluid, with a high boiling point, disagreeable cutting odor and pungent taste, which is separated in the rectification of ordinary alcohol, distilled from grain, malt, potatoes, molasses, beet root and other substances. The composition of fusel oil depends on materials used in the manufacture of the spirit. It acts very harmfully on the body and is often the ingredient which makes inferior kinds of liquor so injurious.

**Fusing Point**, the degree of temperature at which a substance melts or liquefies. This point is very different for different metals. Thus, potassium fuses at 136° F., bismuth at 504°, lead at 619°, zinc at 680°, silver at 1832°, gold at 2282°. Malleable iron requires the highest heat of a smith's forge, 2912°; while cerium, platinum and some other metals are infusible in the heat of a smith's forge, but are fusible before the oxyhydrogen blow pipe and in the electric furnace.

**Fusiyama**, *foo'se yah'mah*. See **FUJIYAMA**.





**G**, the seventh letter in the English alphabet. The Roman alphabet originally contained no such character, the hard *c* sound serving where the *g* came to be used later. *G* always has the hard sound, which is its earliest sound, at the beginning of words of English origin, before the vowels *a*, *o* and *u* and at the end of a word. The soft sound, which is identical with that of *j*, is found usually before *e*, *i* and *y*. In form, also, *G* is a modification of *C*.

In music, *G* is the fifth note of the diatonic scale of *C*.

**Gabelle**, *ga bel'*, a name given in France to a tax upon salt, which was first imposed in 1286 as a temporary import. It was later perpetuated from reign to reign. Salt was made a government monopoly, and every family in France was compelled to buy a certain amount each week, at a price fixed by the government. This price varied among the provinces. The gabelle was extremely unpopular and was finally suppressed by the revolutionary government in 1790.

**Gabers**, *ga'burz*. See GHEBERS.

**Gable**, the triangular part of an outside wall at the end of a building, extending from the eaves to the ridge of the roof. In classic architecture it was part of the pediment and was an important feature, but it did not come into general use until the Romanesque period of architecture in the Middle Ages, when it was common in the formation of the summits of church façades. It was also used as a decorative feature in domestic architecture. The development of tracery in Gothic architecture led to the use of highly decorated gables as ornaments over doorways, windows, pinnacles and other parts of buildings. In the towns of Belgium and Germany to-day, ornamental gables are in use in houses to a great extent.

**Gabriel**, the name given to that one of the archangels whose duty it was to announce to man the will and purpose of God. He appeared to Daniel as the interpreter of a vision, *Daniel*

*viii*, 7; to Zacharias as the herald of the birth of John the Baptist, *Luke i*, 19, and to Mary as the herald of the birth of Christ, *Luke i*, 26.

**Gabun** or **Gaboon'**, a river of French Kongo in Western Africa. The name is strictly applied only to a broad estuary through which several small streams discharge their waters into the Atlantic. It is about 40 miles long and is navigable for the largest vessels.

**Gad**, one of the sons of Jacob, in biblical literature considered to be the father of the tribe of the same name. When the Israelites were about to enter the Promised Land, this tribe was given territory on the east of the Jordan (See *Num.* xxxii). After the conquest of the country, in which the members of the tribe agreed to assist, they returned to the territory assigned and dwelt there for nearly seven hundred years. During this time this tribe, together with others of the Israelites, was involved in numerous wars with surrounding nations, and in 734 it was taken captive by Tiglath-Pileser and extinguished.

**Gade**, *gah'de*, NIELS WILHELM (1817-1890), a famous Danish musician and composer, born at Copenhagen. He was first compelled to learn the trade of a cabinetmaker under his father's instruction, but soon abandoned it to begin a course of musical study. At the age of sixteen he made his début as a concert violinist. He won numerous prizes for composition and through the aid of the king completed his education at Leipzig, where, in the absence of Mendelssohn, he for a time directed the Gewandhaus concerts and became permanent conductor in 1847. Three years later he returned to Copenhagen, where he became master of the Chapel Royal and director of music. Gade was one of the leading figures in the new romantic movement in music and received the highest honors from leading critics and musicians of his time. Among his compositions the best-known are probably the *Erl King's Daughter*, *The Springtide Fantasy* and *The Crusaders*.

## Gadfly

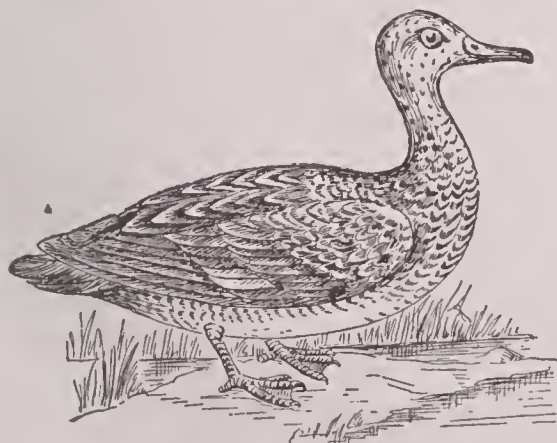
**Gadfly**, a name that is given to several different species of small flies which are troublesome pests in the woods during the summer months. The common black gadfly, which is found in many parts of the United States, sucks the blood of man and other animals through its sharp proboscis and, if permitted, will lay its eggs in the wound, producing sores.

**Gad'sden**, ALA., the county-seat of Etowah co., 60 mi. n. e. of Birmingham, on the Coosa River and on the Chattanooga Southern and other railroads. The industries include blast-furnaces and the manufacture of cars, lumber, machinery, doors, sash, blinds and wagons. It was settled about 1845 and incorporated in 1867. Population in 1910, 10,557.

**Gadsden Purchase**, the name given to a tract of land in the southern part of New Mexico and Arizona, purchased from Mexico by the United States in 1854, through the agency of James Gadsden. It is bounded on the north by the Gila River, on the east by the Rio Grande, on the west by the Colorado and on the south by an arbitrary line. Its average width is about 120 miles, and it includes an area of about 45,535 square miles. The United States paid Mexico \$10,000,000 and made other concessions. The treaty was negotiated in 1853 and was ratified in the following year. It caused such opposition in Mexico that Santa Anna was banished.

**Gadski**, *gahd'ske*, JOHANNA (TAUSCHER) (1871- ), a German operatic singer, born in Prussia and educated at Stettin. She made her debut in New York City. Madame Gadski has sung at several festivals and has been particularly successful in Wagnerian rôles. She has made several concert tours of the United States.

**Gad'wall**, a rather large fresh-water duck,



GADWALL

common in the interior of the United States and breeding north of Kentucky. It is a black

## Gage

and white duck, marked with brown, and is one of the favorite game birds.

**Gael**, *gale*, the name of a branch of the Celts, inhabiting the Highlands of Scotland, Ireland and the Isle of Man. Gaelic is the name now generally restricted to that dialect of the Celtic language which is spoken in the Highlands of Scotland and is distinguished from Manx and Irish, the other two kindred dialects.

**Gaeta**, *gah a'tah*, a city and very strong fortress in Italy, situated 74 mi. n. w. of Naples on the Gulf of Gacta. On the promontory on which the city stands is the Torre d'Orlando, the tomb of Munatius Plancus, the friend of Augustus. It stands 160 feet high and has a diameter of 160 feet. Other objects of interest are the campanile of the Cathedral of Saint Erasmus and the remains of a Roman theater. This city carries on a fairly extensive trade in fish, oil, wine and fruit. It was originally a Greek colony. After resisting the barbarian invaders, it became a part of the Byzantine Empire. In 1134 it was annexed to the Norman kingdom of Sicily. Population in 1911, 5500.

**Gage**, *gaje*. See GAUGE.

**Gage**, LYMAN JUDSON (1836- ), an American financier, born in New York. He moved to Chicago in 1855 and in 1858 entered the service of the Merchants' Loan & Trust Company. Later he became manager of the clearing house and was elected president of the First National Bank in 1882. He was three times chosen president of the American Bankers' Association, was twice president of the Civic Federation of Chicago, and was the first president of the board of directors of the World's Columbian Exposition. He was secretary of the treasury under President McKinley from 1897 to 1902, and from 1902 to 1906 president of the United States Trust Company of New York.

**Gage**, THOMAS (1721-1787), an English soldier and colonial governor of Massachusetts, born in Sussex, England. He entered the British army and served in Scotland and Flanders and with Braddock in America. At the outbreak of the last French and Indian War, he was made brigadier general and served at the head of a regiment of colonial troops. He was governor of Montreal in 1760, became major general in the following year and at the end of the war was commander in chief of the British forces in America. In 1768 he was placed at the head of a British force in Boston, but returned to England in 1772. Two years



later he was appointed military governor of Massachusetts and aroused bitter resentment by his vigorous enforcement of the Boston Port Bill and the Navigation acts. It was through his order to the troops to seize the military stores at Concord that the first battle of the Revolutionary War was fought. He commanded the troops at Bunker Hill, but was recalled to England in October, 1775.

**Gag Rules**, the name given in American history to certain rules passed by the Federal Congress abridging the right of petition. They were the result of the agitation of the northern Abolitionists, who presented petitions to Congress urging the abolition of slavery or steps to that end. John Quincy Adams identified himself with this movement and presented a vast majority of the petitions sent to Congress. In May, 1835, however, the so-called Pinckney Resolutions were adopted, practically providing that such petitions should be disregarded.

**Gail Hamilton.** See DODGE, MARY ABIGAIL.

**Gaines's Mill, BATTLE OF.** See PENINSULA CAMPAIGN.

**Gainesville, FLA.**, the county-seat of Alachua co., 75 mi. s. w. of Jacksonville, is on the Atlantic Coast Line and other railroads. It is a center of phosphate mining, truck farming, turpentine distilling and lumbering. It is the seat of the University of Florida and the Florida Agricultural Experiment Station. Population in 1910, 6183.

**Gainesville, TEX.**, the county-seat of Cooke co., 65 mi. n. of Fort Worth, on the Atchison, Topeka & Santa Fé and the Missouri, Kansas & Texas railroads. The city is in an agricultural and stock-raising country and has packing-houses, brickyards, flour and cottonseed oil mills and other factories. It was settled in 1851 and was incorporated in 1873. Population in 1910, 7624.

**Gainsborough, gaynz'b'ro, THOMAS** (1727-1788), an English painter, born at Sudbury, in Suffolk. He was one of the original thirty-six academicians. He rivaled Sir Joshua Reynolds as a portrait painter and showed no less originality in landscape. He painted portraits of Garrick, Mrs. Siddons, Pitt, Blackstone, Burke and many other notable people. One of his most celebrated productions is *Duchess of Devonshire*, which was bought originally for \$305, but sold for more than \$50,000 in 1876. Other paintings are *Boy Blue*, considered his greatest work, *Rustic Children*, *The Cottage Door* and *The Harvest Wagon*.

**Gaius**, a Roman jurist, the chief source of present knowledge of Roman law prior to the revision of Justinian. His principal work was the *Institutes*, which, with others of his writings, were liberally used and quoted by Justinian in his *Digest of Roman Law*. The facts in the life of Gaius are practically unknown, and his writings were lost until early in the nineteenth century, when German scholars discovered them in secluded libraries.

**Galacz, gah'lahts.** See GALATZ.

**Gal'ahad**, Sir, in legends of the Holy Grail, the son of Launcelot and Elaine, the purest of the knights of the Round Table and the only one who was permitted to see clearly the Holy Grail.

**Ga'lapa'gos**, a group of 13 islands of volcanic origin, in the North Pacific Ocean, about 600 mi. w. of the coast of Ecuador, to which they belong. The total area is 2400 square miles. The most important are Albemarle, 60 miles long by 15 broad, rising 4700 feet above the sea; Indefatigable, Chatham, Charles, James and Narborough. Turtles are very numerous and form the principal product of the islands. Sugar is grown, and cattle are raised to some extent. The islands were explored by Darwin in 1858, and they have been visited by many naturalists, because of the interesting animal and vegetable life found there. Many forms are peculiar to the islands, and there are almost no species in common with the rest of South America.

**Gal'ate'a**, in classic mythology, a nymph, the daughter of Nereus and Doris, who rejected the suit of the Cyclops Polyphemus and gave herself to the Sicilian shepherd Acis. The monster surprised them and crushed Acis beneath a rock. See PYGMALION.

**Galatia, ga la'she ah**, the ancient name of an extensive region in Asia Minor, so called from its Gallie inhabitants, who settled there in the third century B. C. These were compelled by Attalus, king of Pergamos, to settle within well-defined limits between Paphlagonia, Pontus, Cappadocia, Lycaonia, Phrygia and Bythina. Galatia became a Roman province under Augustus and was divided into provinces by Theodosius. It was twice visited by the apostle Paul, who later addressed one of his famous letters to the people of Christian churches in the region. It forms the ninth book of the New Testament. See GALATIANS, THE EPISTLE TO THE.

**Galatians, THE EPISTLE TO THE**, a letter of the New Testament, written by Paul to the Galatian churches, to warn them against those who

## Galatz

were trying to influence them to adopt Jewish rites and to defend himself from the unjust criticisms being made. The letter is claimed by some to be earlier than those to the Thessalonians.

**Galatz** or **Galacz**, *gal'lahts*, a town and port of Rumania, in Moldavia, on the left bank of the Danube, between the mouths of the Sereth and Pruth. The new portion of the town is substantially built and is the seat of the European commission for the control of Danube navigation. The city is an important trading center and port, the chief exports being grain (principally maize), wine, planks and tallow. The imports are chiefly British manufactures, sugar, tin plates, iron and steel, coal, oil, fruits, tobacco, fish, glassware, leather and coarse cloth. Population in 1912, 71,719.

**Gal'axy**. See MILKY WAY.

**Gal'ba**, **SERVIUS SULPICIUS** (3 B. C.—69 A. D.), a Roman emperor. He served as general in Germany and as proconsul to Africa, his services there obtaining him the honors of a triumph. He then lived in retirement till the middle of Nero's reign, when the emperor appointed him governor in Spain. Nero soon afterward, however, ordered Galba to be secretly assassinated. Galba revolted, and on the death of Nero, he himself was chosen emperor by the praetorian cohorts in Rome. He went directly to Rome, but soon made himself unpopular by cruelty and avarice, and was slain in the Forum.

**Ga'len**, properly **Claudius Galenus**, (130–200 A. D.), a Greek physician. Among the many writings attributed to Galen are eighty-three treatises acknowledged to be genuine. The most valuable of his works were those dealing with anatomy and physiology, and he was the first to establish the consultation of the pulse in determining the nature of disease. Till the middle of the sixteenth century his authority in medicine was supreme.

**Gale'na**, **ILL.**, the county-seat of Jo Daviess co., 17 mi. s. e. of Dubuque, Ia., on the Galena River and on the Illinois Central, the Chicago & Northwestern and the Chicago, Burlington & Quincy railroads. General U. S. Grant lived here for a time before the opening of the Civil War, and the old homestead is still a feature of interest. The city contains a fine Federal building, a public library and Grant Park, with a statue of the general. There are lead and zinc mines in the vicinity, and the city contains smelting works and shoe and other factories. The town was settled in 1827 and was chartered as a city in 1839. Population in 1910, 4835.

## Galicia

**Galena**, **KAN.**, a city in Cherokee co., 7 mi. w. of Joplin, Mo., on the Saint Louis & San Francisco and the Missouri, Kansas & Texas railroads. It is in a mining region about four miles square, which produces large quantities of lead and zinc and contains about 200 concentrating mills. The city also has lead smelters, a large foundry and a planing mill. Galena was settled and incorporated in 1877. It grew very rapidly between 1890 and 1900, but later it began slowly to decline. Population in 1910, 6096.

**Galena** or **Lead Glance**, the sulphide of lead, found both in masses and crystallized in eubes. Its color is bluish-gray, like lead, but brighter. It has a metallic luster and foliated texture and is soft and brittle. For the most part it contains about eighty-seven parts lead to thirteen of sulphur, and generally it also has some silver, antimony, zinc, iron and bismuth. Where the proportion of silver is high it is known as *argentiferous galena*, and it is then worked with a view to the extraction of this metal. In the United States galena is abundant, occurring in large quantities near Galena, Ill., in Colorado, Idaho and Montana, and in smaller quantities in Iowa, Missouri and Wisconsin. See **LEAD**.

**Galesburg**, *gaylz'burg*, **ILL.**, the county-seat of Knox co., 43 mi. n. e. of Burlington, Iowa, on the Atchison, Topeka & Santa Fé, the Chicago, Burlington & Quincy and other railroads. The city has an attractive location and is the seat of Knox College and Lombard University. The industrial establishments include railroad shops, stockyards, iron foundries, brickyards and manufactures of engines, wagons and agricultural implements. The place was settled in 1837 by New Yorkers and was named in honor of Rev. George W. Gale, who planned the town as the site for a theological seminary and a rallying-ground for the "Free-Soilers" of the territory. Population in 1910, 22,089.

**Galicia**, *ga lish'e ah*, a province of Austria, bounded by Russia, Bukowina, Hungary and Sillesia. It has an area of about 30,300 square miles, consisting mostly of hills and plateaus, and is separated from Russian Poland by the Carpathian Mountains. Several rivers of importance flow through the country, those in the west being tributaries of the Vistula, those in the east, of the Danube and Dniester. The climate is severe, particularly in the south, the summers being very warm, but comparatively short. The soil in general is fertile and yields abundant crops of cereals, hemp, flax, tobacco, hops and



## Galilee

beets. The domestic animals include great numbers of horned cattle and a fine, hardy breed of horses. Bears and wolves are still found in the forests, and all the lesser kinds of game are in abundance. The minerals include marble, alabaster, copper, calamine, coal, iron and rock salt. Only the last two are of much importance. The most important rock salt mines are at Wieliczka. Distilleries exist in every quarter. The chief educational establishments are the University of Lemberg and that of Cracow. These two places are also the principal cities, and the former is the capital. Galicia is now one of the Cis-Leithan provinces of Austria-Hungary. Polish is the language of official intercourse and of the higher educational institutions. Population in 1910, 8,025,675.

**Gal'ilee**, in the time of Jesus Christ the most northern province of Palestine, bounded on the e. by the river Jordan, on the s. by Samaria, on the w. by the Mediterranean Sea and Phoenicia and on the n. by Syria and the Mountains of Lebanon. It was in a sense the cradle of Christianity, Nazareth, Cana, Capernaum, Nain and other places being intimately associated with the life of Christ. The inhabitants of this country, mostly poor fishermen, on account of their ignorance and simplicity of manners were despised by the Jews, who, by way of contempt, called Christians, at first, *Galileans*. At present Galilee is included in the province of Syria. See PALESTINE.

**Galilee**, SEA OF. See GENNESARET, LAKE OF.

**Galile'o** (1564-1642), the common designation of Galileo Galilei, a most distinguished Italian philosopher and astronomer, born at Pisa and educated at the university there. When he was nineteen years of age, the swinging of a lamp in Pisa cathedral led him to investigate the laws of the oscillation of the pendulum, which he subsequently applied in the measurement of time, and in 1586 the works of Archimedes suggested his invention of the hydrostatic balance. He now devoted his attention exclusively to mathematics and natural science and was made professor of mathematics at the University of Pisa and later held the same position in Padua, where he continued eighteen years. His lectures there acquired European fame, and there also he made the important discovery of the law regulating the motion of falling bodies. If he did not invent, he improved, the thermometer and made some interesting observations on the magnet. His most remarkable discovery was

## Galileo

that of Jupiter's satellites, and he observed, though imperfectly, the rings of Saturn. He also detected the sun's spots and inferred, from their regular advance from east to west, the rotation of the sun and the inclination of its axis to the plane of the ecliptic. In 1610 Cosmo II, grand duke of Tuscany, appointed him grand-ducal mathematician and philosopher, and he lived



GALILEO

sometimes in Florence and sometimes at the country seat of his friend Salviata, where he discovered the varying phases of Mercury, Venus and Mars. In the next year he visited Rome for the first time and was treated with great distinction. Four years later he again visited Rome, but this time was not so warmly received, as in the meantime he had published his work on the solar spots, in which he had advocated the Copernican system, in spite of the hostility of the churchmen. He was, in consequence, denounced as a propounder of heretical views. Some time afterward he wrote his most famous work and received papal permission to publish it, but hardly had it been issued, when Pope Urban VIII, having been led to believe that Galileo had satirized him in this work, allowed him to be summoned to Rome in 1623 to be tried by the Holy Office. Several writers asserted that Galileo was imprisoned for heresy; but

## Galion

most modern authors agree that although a sentence of imprisonment was pronounced upon him it was never enforced. His remains were buried within the Cathedral of Santa Croce, in Florence.

**Gal'ion, OHIO**, a city in Crawford co., 80 mi. s. w. of Cleveland, on the Erie and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. Its industries include railroad shops, brick and tile works, wagon factories, iron foundries and lumber mills. The place was laid out in 1831 and became a city in 1878. Population in 1910, 7214.

**Gall, gahl, FRANZ JOSEPH** (1758-1828), the founder of phrenology, born in Tiefenbrunn, Baden. He studied medicine and practiced at Vienna as a physician where he made himself known to advantage. After a series of comparisons of the skulls of both men and animals, he was able to assign the particular location of twenty organs. He accompanied Dr. Spurzheim, in 1807, to Paris, where he published with Spurzheim, in 1810 and 1812, several books on the nervous system. See PHRENOLOGY.

**Gallait, ga lay' LOUIS** (1810-1887), a Belgian historical painter. His best known works are *Montaigne Visiting Tasso in Prison*, *Abdication of Charles V*, *The Dead Bodies of Counts Egmont and Horn*, *The Last Moments of Count Egmont*, *Alva Signing Death Warrants* and *The Plague at Tournai*. This last was purchased for the Brussels Museum at the price of \$24,000.

**Gallas, gahl'las**, a numerous and powerful race, chiefly inhabiting a territory in East Africa, lying to the south of Abyssinia. Their color varies from a deep black to a brownish yellow. In stature they are tall, with spare, wiry and muscular bodies. Their noses are often straight, or even arched; their lips are moderate, and they often wear their hair hanging over their necks in long, twisted plaits. They are brave, but ferocious and cruel, cunning and faithless. Their language is spoken throughout a great part of Africa.

**Gal'latin, ALBERT** (1761-1849), an American statesman and financier, born in Geneva, Switzerland. He received a thorough education in his native land and then emigrated to the United States, arriving in 1780. He entered business, but without success, was instructor in Harvard College for a time and then removed to Fayette County, Pa. Here he became prominent as an earnest opponent of the Federal Constitution and served as an Anti-Federalist in the state legislature in 1793. He was elected to the

## Galley

United States Senate, but was forced to withdraw because he had not lived the requisite time in the United States. He was an opponent of the excise law, but labored earnestly to suppress the Whisky Insurrection. In 1795 Gallatin entered Congress, becoming a leader of the Republican party, and displaying preëminent ability as a judge of financial measures. Jefferson therefore made him secretary of the treasury in 1801. During his term he carried out Hamilton's wise policy, but instituted original reforms which decreased the national debt and placed the finances of the nation in a condition where a successful war with England could be carried on without serious embarrassment. He strongly opposed the War of 1812, labored earnestly to bring about peace and was a leading negotiator in the Treaty of Ghent. He refused to resume the secretaryship of the treasury in 1816, but accepted the office of minister to France, which he filled until 1823. Three years later President Adams appointed him as minister to England, but after two years he withdrew to private life.

**Gall, gawl, Blad'der, THE**, a pear-shaped sac, attached to the under side of the liver, the small end contracting into the cystic duct. The walls of the gall-cyst are composed of an outer, or serous, coat, continuous with the peritoneum, a middle, or muscular, coat, and an inner, or mucous, coat. This bladder acts as a storehouse for bile. During the interval between meals, the bile, which is continually being secreted by the liver, passes into the common bile duct to find the opening into the duodenum closed by its sphincter muscle; it is therefore forced up through the cystic duct, which has an opening into the common duct, into the gall bladder, where it remains till food enters the small intestine. By some reflex movement the bile is then discharged with force enough to open the sphincter. See BILE; DIGESTION.

**Gal'ley**, a low, flat-built vessel, with one deck, once commonly used in the Mediterranean. It was navigated with sails and oars. The common galleys varied from 100 to 200 feet in length, those of smaller sizes being known respectively as half-galleys and quarter-galleys. The larger ones carried as many as twenty oars on each side, each oar worked by one or more men, and they had commonly two masts with lateen sails. Raised structures in the sterns, and even in the prow, were not uncommon. These, however, were more fully developed in the kind of galley known as the *galleass*, which



## Gallinule

carried three masts, from 200 to 300 rowers and sometimes twenty guns. France formerly had a number of galleys for service in the Mediterranean, in which convicts were forced to labor. The term galley is also applied to the ships of the ancient Greeks and Romans, especially to their war ships, which were propelled chiefly by oars.

**Gal'linule**, a name for certain water birds belonging to the rail family. Though not web-footed, they are good swimmers, for their toes are furnished with a narrow membrane. The only American species is the purple gallinule, found mainly in the Southern states, but occasionally in the Middle and Northern states.

**Gallip'oli**, a town in European Turkey, on a peninsula of the same name at the n. e. end of the Dardanelles, 128 mi. w. s. w. of Constantinople. It was once fortified, but is now in a generally dilapidated condition, with no edifice of note except the bazaars. It has manufactures of cotton, silk and morocco leather, and it also has two harbors, one used as a station for the Turkish fleet and the other for trade, chiefly in corn, wine and oil. It was the gate by which the Turks entered Europe (1357), and in the Crimean War the allied forces landed here (1854). Population, about 25,000.

**Gal'lipolis'**, OHIO, the county-seat of Gallia co., 56 mi. s. e. of Chillicothe, on the Ohio River and on the Toledo & Ohio Central and other railroads. The city is in the neighborhood of coal fields and has iron and wood-working establishments and manufactures of furniture, stoves, woolens and other articles. It has a public library and Gallia Academy. The place was settled in 1790 by a party of Frenchmen under the Scioto Company. Population in 1910, 5560.

**Gal'lium**, a rare malleable metal, discovered by spectrum analysis in 1875 by De Boisbaudran in zinc blende of Pierrefitte in the Pyrenees. It is of a grayish-white color, has a brilliant luster and is fused by the mere warmth of the hand. In its properties it is related to aluminum.

**Gal'lon**, a unit of capacity in the English system of weights and measures, used chiefly for measuring liquids. It contains 231 cubic inches, being equal to a cylinder 7 inches in diameter and 6 inches high. It is equivalent to 3.7853 liters. In England an *imperial gallon* is also used, containing 277.274 cubic inches. A gallon is divided into 4 quarts, each quart into 2 pints and each pint into 4 gills.

**Galls**, *gawls*, unnatural growths in plants,

## Galvani

produced by the deposit of the egg of an insect, especially the gallfly, in the bark or leaves. The galls of commerce are produced in the tender shoots of a species of oak, abundant in Asia Minor, Syria and Persia. They are spherical and vary in magnitude from the size of a pea to that of a hazel-nut. White, green and blue varieties are recognized, the last kind being the best. The peculiar properties of the galls rest in gallic acid, a white substance which is obtained from them. Galls are extensively used in dyeing and in the manufacture of ink, and they are also frequently used in medicine. They are chiefly imported from Aleppo, Tripoli and Smyrna.

**Galsworthy**, JOHN (1867— ), an English author whose dramas and novels have attracted wide attention. Almost all his works deal with present-day social questions, and as he is distinctly a realist his method is to state problems rather than to solve them. He possesses an attractive literary style and the ability to present characters clearly and sympathetically. His novels include *Villa Rubein*, *The Man of Property*, *The Country House*, *Fraternity*, *A Motley* and *The Patrician*; and noteworthy among his plays are *Strife*, *Justice* and *The Pigeon*.

**Galton**, *gawltun*, FRANCIS (1822-1911), an English scientist, the cousin of Charles Darwin. He was born at Duddleston, Warwickshire, and educated at King's College, London and Trinity College, Cambridge. His extensive travels in Africa led to works on the topography of southwest Africa, and he published also *Meteorographica*, studies in meteorology which introduced the system of charting the weather which remains in use today. Most important of Galton's contributions to science, however, were his studies in heredity. He sought for the principles governing the inheritance of physical and mental traits, and founded the science which deals with the possibility of improving the hereditary qualities of the human race. To this new science he gave the name of *eugenics*, which means "well born." His works treating of this subject include *Hereditary Genius* and *Natural Inheritance*. See EUGENICS.

**Galvani**, *gal vah'ne*, LUIGI (1737-1798), an Italian physician and physiologist, born at Bologna. He practiced medicine in Bologna and was in 1762 appointed professor of anatomy at the university. He gained repute as a comparative anatomist; but his fame rests on his theory of animal electricity, enunciated in a treatise published in 1791. Twenty years before

## Galvanic Battery

the publication of this treatise, he had been making experiments on the relations of animal functions to electricity. In 1797 he was deprived of the chair of anatomy for refusing to take the oath of allegiance to the Cisalpine Republic, but he was restored to it in less than a year. See ELECTRIC BATTERY.

**Galvanic Battery.** See ELECTRIC BATTERY.

**Galvanism**, the production of electricity by chemical action. The name is derived from Galvani, professor of anatomy at Bologna, who observed that the limbs of a dead frog could be caused to move by the contact of metals. His experiments attracted the attention of Volta, professor of natural philosophy at Pavia, who shortly afterward invented the galvanic, or voltaic, battery. See ELECTRIC BATTERY.

**Galvanized Iron**, a name loosely given to sheets of iron coated with zinc. The iron is first cleansed by friction and the action of dilute sulphuric acid, and is then plunged into a bath, composed of melted zinc and sal-ammoniac. As the zinc cools, it forms in crystals on the surface, and this gives to galvanized iron its mottled appearance. So long as the coating is entire, and is not exposed to corrosive substances, galvanized iron is very durable. It is used for making cornices, jackets for furnaces and vessels for holding water. Drinking water should not be kept in galvanized iron vessels, because the zinc dissolves and poisons the water.

**Galvanometer**, an instrument for measuring the strength of a delicate electric current. While there are numerous patterns of galvanometer, all are constructed on the principle that an electric current will change the direction of a magnetic needle. The galvanometer consists of a magnetic needle delicately balanced over an electro-magnet. When a current is sent through the coils of the magnet, the needle is turned to the right or left, according to the direction of the current. The strength of the current is estimated by the number of degrees over which the needle moves.

**Galveston, TEX.**, the county-seat of Galveston co., on an island of the same name at the mouth of Galveston Bay, and connected with the Southern Pacific, the Gulf, Colorado & Santa Fé, the Missouri, Kansas & Texas and other railroads; and there are also regular steamship lines to American coast cities and to all important foreign countries, and an electric road to Houston. The city is the seat of the state medical university, Saint Mary's University, the Ball

## Galway

High School and various other educational and charitable institutions. Prominent among these is the Rosenberg Library, which cost \$150,000 and has an endowment of \$400,000. Other important structures are the Sealy Hospital, the courthouse, the custom house and postoffice, the railroad station, the Y. M. C. A. building and several fine business houses.

Among the industrial establishments are ice-plants, iron works, cottonseed oil mills, rice and flour mills and manufactories of cement, pipe, clothing, flour and various foods. The channel between the island and the mainland has been so improved by the Federal government that it now affords an entrance of 28 feet of water into an excellent harbor, with a wharf frontage of over six miles. During the year 1905-1906 the city advanced to the second place among the exporting ports of the United States, and it has long occupied first place in exporting cotton. Other foreign exports are cottonseed oil, wheat, copper, iron ores, cattle and provisions.

The first permanent settlement was made here in 1837 and incorporation followed two years later. The city suffered from a big fire in 1885. In 1900 it was the scene of a terrible disaster from a hurricane, originating in the West Indies. About \$18,000,000 worth of property was destroyed and about 6000 lives were lost in the city and adjacent country. The city is now protected by a sea wall, completed in 1904, which forms the greatest structure of the kind in the world. It is 17,593 feet long, 16 feet wide at the base and 5 feet at the top, and stands 17 feet above mean low tide. Just after the great storm of 1900, this city originated and adopted the Commission Form of City Government. Population in 1910, 36,981.

**Galveston Bay**, an inlet of the Gulf of Mexico, separated from the main gulf by Galveston Island. Its area is about 450 square miles and its length from the city of Galveston northward, about 35 miles.

**Gal'way**, a seaport of western Ireland, capital of the County of Galway, at the mouth of the Corrib, in Galway Bay, 117 mi. w. of Dublin. The chief exports are agricultural produce and marble. There are mills for sawing and polishing marble, a brewery, a distillery, foundries and flour and other mills. The town has a good harbor and good fisheries. The chief buildings are the Church of Saint Nicholas, Saint Augustine's Catholic church, Queen's College and several monasteries and nunneries. Population in 1911, about 14,500.



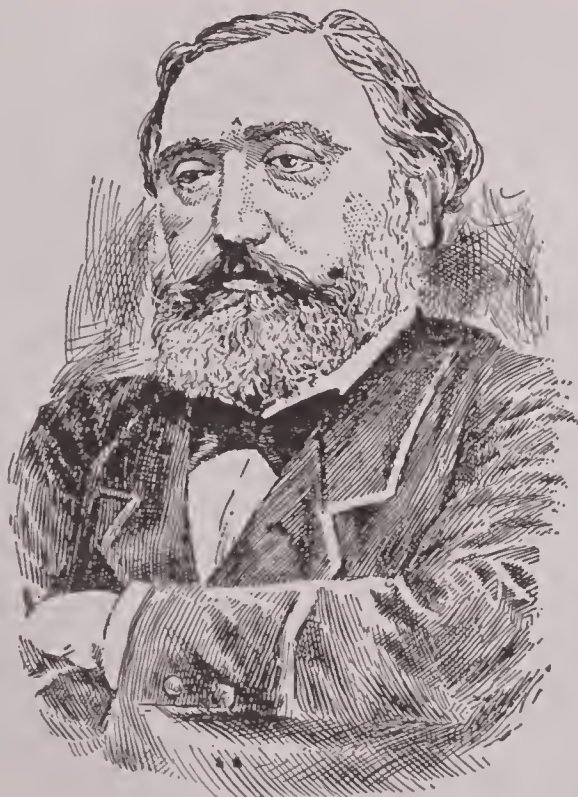
## Galway Bay

**Galway Bay**, a large bay on the west coast of Ireland, between County Galway on the north and County Clare on the south, about 30 miles in length and from 7 to 20 miles in breadth. Across its entrance lie the Arran Islands, and there are numerous small islands in the bay.

**Gama**, *gah'ma*, VASCO DA (1469-1524), the first navigator who made the voyage to the East Indies by the Cape of Good Hope. He was born in Portugal, of a noble family. He sailed from Lisbon on July 8, 1497, and, doubling the Cape, to Calicut, returning to Lisbon in 1499. For sailed this exploit he was named admiral of the Indies, with an annual pension and extensive privileges in Indian commerce. In 1524 he was appointed viceroy of India by King John III, but he died in the same year.

**Gama Grass** or **Sesame Grass**, an American grass, of which but two or three species are known. Because of its ability to endure a long drought, it is a valuable fodder grass in dry regions and is cultivated especially in the southwestern United States, Mexico, parts of Europe and Australia.

**Gambet'ta**, LEON (1838-1882), a French statesman. In 1869, having been elected by both



LEON GAMBETTA

Paris and Marseilles, he chose to represent the southern city in the Chamber of Deputies and showed himself an irreconcilable opponent of the Empire and its measures, especially of the policy which led to the war with Prussia. When the

## Game

Germans encircled Paris, he left that city in a balloon and set up his headquarters at Tours, from which, with all the powers of a dictator, he directed for a short time a fierce but vain resistance against the invaders. After the close of the war he held office in several short-lived ministries, and in November, 1881, he became premier.

**Gam'bia**, a British colony and protectorate in West Africa, at the mouth of the river Gambia. The area of the colony is 4 square miles; of the protectorate 4,500 square miles. The climate is very unhealthy in the rainy season, and there is little fertile land in the colony, but a considerable trade is carried on in groundnuts, hides, beeswax, rice, cotton, maize, ivory, ginger, gum arabic and palm oil. Population of the colony in 1911, 7700; of the protectorate, 138,000.

**Gambia**, a river of West Africa, rising in a mountainous district in Futa Jallon and flowing northwest and west to the Atlantic. Its length is over 700 miles. It is navigable for 600 miles during seven months of the year, but from June to November the river becomes a torrent, rising from 20 to 50 feet and leaving a rich alluvial deposit on its shores.

**Gam'bir**, a puckery, earthy-looking substance, chiefly employed in tanning and dyeing, and obtained from East Indian trees. It is mainly imported from Singapore.

**Gambling** or **Gaming**, in general usage, the playing of a game of hazard for the purpose of pecuniary gain. Gambling is now discountenanced by all civilized communities, and contracts made in gambling are not recognized as binding in law. Almost all countries now have laws forbidding or greatly restricting the practice. In the United States and England any one who keeps a gambling house may be punished for maintaining a nuisance, and any one who cheats at games can be indicted for obtaining money under false pretenses. There is a tendency to make the laws against gambling more strict and to bring within the application of the law a greater number of practices. It has been held that contests of skill in which there is a prize are not gambling unless the element of chance predominates. Thus, contestants in a foot race for a prize would not be gamblers, but bettors upon the result of the contest would be gamblers. See WAGER.

**Game**, in its original and widest sense a word which means any sport or amusement. It has two important derived meanings: first, a sport played according to fixed rules; second, those animals which are the objects of the chase and







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# GAME ANIMALS OF NORTH AMERICA

1—Caribou. 2—Moose. 3—Wapiti. 4—Pronghorn. 5—Bighorn Sheep. 6—Bison (no longer at large).



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## GAME BIRDS OF NORTH AMERICA

1—Mallard Duck. 2—Prairie Hen. 3—Canvasback Duck. 4—Wild Turkey. 5—Snipe. 6—Partridge.  
7—Canada Goose.





are hunted for their flesh, as distinguished from meat, fish and poultry. The game animals of the world are the wild animals. In Africa and some other parts of the world, lions, tigers, panthers, leopards, foxes, alligators and many other large animals are regarded as *big game*, though their flesh is almost never eaten. In the United States and Canada the only important big game animals are bears, moose, deer, antelopes, mountain sheep and goats. The buffalo was formerly one of the game animals, but is now almost extinct. Of the smaller animals, foxes, rabbits and hares are most common.

The game birds are more plentiful than the quadrupeds. An extensive list is not possible here; only the most important are given: partridge, grouse, plover, quail, snipe, curlew, woodcock, rail, ducks, swans and geese. The term wild fowl is usually applied only to the last three. Among the common varieties of ducks are the mallard, redhead, canvasback, teal, pintail and wood duck. See color-plates, **GAME ANIMALS**, **GAME BIRDS**.

**GAME LAWS.** In modern times the growth of population and the threatened extinction of all wild game has led to the passage of laws for the regulation of hunting, both to protect game from destruction and to protect persons in the legitimate enjoyment of such sport. Such laws have been passed from time to time in America ever since the landing of the Pilgrims, in almost every case for the purpose of protecting the game. Hunting and fishing are regulated chiefly by compelling the taking out of licenses, by limiting the number which each hunter may kill or may ship, by making more stringent the laws of trespassing and by forbidding the killing during the mating season and period of reproduction. The chief subjects of such laws have been the deer, quail, grouse, prairie chicken, ducks and especially valuable or rare fish, such as trout and muskellunge. In almost every state of the United States and in every province of Canada, the killing of quail, grouse, prairie chickens, ducks, moose and deer is prohibited during certain seasons varying according to the habits of the species of the several localities. By an act of Congress, approved March 4, 1913, all birds which do not remain within the borders of a single state are placed under the protection of the United States department of agriculture. The regulations permitted by the law were proclaimed by the president on October 1, 1913; they established a breeding zone and a wintering zone, with separate closed seasons for each.

**GAME PRESERVES AND RESERVATIONS.** In medieval Europe it was the rule for princes to maintain private breeding and hunting grounds. This custom was adopted by the nobles and is still in force in Austria-Hungary, Germany, England and Scotland, where immense properties known as hunting estates are maintained by private land owners for the preservation of game.

In the United States the preservation of game has been assumed as a function of the national, state and local governments, and the greatest efforts are being made to prevent the extinction of peculiar species, such as the bison, the caribou, the eagle and other interesting birds and beasts. To further this end, tracts of land have been set aside where such animals can live the life their instincts demand, free from the depredations of hunters or the annoying presence of settlers. The first and largest of such reservations in the United States is the Yellowstone National Park, having an area of over three thousand square miles. At the present time there are many such sequestered tracts, situated in states and territories west of the Mississippi River, embracing a total area of more than ten thousand square miles. Canada has also made generous provisions for the same purpose, the largest of all such reserves being the Rocky Mountain Park, Alberta, with an area of 4500 square miles.

Beside these government reservations, there are large private parks ranging from 10,000 to 80,000 acres each. Probably the finest game preserve in America is that of the late George W. Vanderbilt at Biltmore, North Carolina. The game preserves in Canada are of enormous extent, though comparatively few in number. That of the Roberval Club, in the Laurentian Mountains, contains over 500 square miles.

**Ganges**, *gan'jeez*, a river of Hindustan, one of the greatest rivers of Asia, rising in the Himalaya Mountains, in Garhwal, and formed by the junction of two head streams, the Bhagirathi, which emerges from a glacial cavern, 13,800 feet above sea level, and the Alaknanda. These unite at Deoprag, 133 miles from the source of the Bhagirathi. At Hardwar, about 30 miles below Deoprag, the river enters the great valley of Hindustan and flows in a southeast direction till it discharges itself by numerous mouths into the Bay of Bengal, after a course of about 1500 miles. In its course it receives the Jumna, Ramgunga, Gumti, Gogra, Son and Kusi rivers. In the rainy season the flat country of Bengal is overflowed to the extent of 100 miles in breadth,



the water beginning to recede after the middle of August. The Ganges delta, which is seemingly the largest delta in the world, has the Hugli on the west and the Meghna on the east and commences about 200 miles from the sea. The valley is one of the most fertile in the world and grows almost all kinds of Indian vegetation, including rice, fruit, cotton, indigo, opium, sugar and grains. The value of the Ganges as a highway for commerce is very great. Some of the principal cities on it and its branches, ascending the stream, are Calcutta, Murshedabad, Bahar, Patna, Benares, Allahabad, Cawnpore and Faruckabad. It is an imperative duty of the Hindus to bathe in the Ganges, or at least to wash themselves with its waters and to distribute alms, on certain days. The Hindus believe that whoever dies on its banks and drinks of its waters before death is exempted from the necessity of returning into this world and commencing a new life.

**Ganges Canal**, a canal extending along the Ganges River from Hirdwoc to a point on the Jumna, a little above its junction with the Betwa. Its total length exceeds one thousand miles, for four hundred of which it is navigable.

**Gan'glion**, the enlargement of a nerve, containing cells and fluids and acting as a center for communication with other sets of nerves or for strengthening nervous impulse. See NERVOUS SYSTEM.

**Gan'grene**, the death of some part of a living body, wherein the tissues are in a state of mortification. If a vital part is so affected, death will ensue, but a local affection may be stopped by amputation or, in milder cases, by natural causes. Formerly, gangrene was a common accompaniment of wounds, especially in times of war, but modern aseptic methods prevent gangrene in nearly every wound that is promptly treated.

**Gan'net**, a large sea bird, about three feet in length, with a wing expansion of six feet. It has a dirty white plumage and pale yellow eyes, surrounded by a naked blue skin. Its straight bill is about six inches long and is furnished, underneath, with a kind of pouch. The gannet is found from the Arctic Sea to the Gulf of Mexico and breeds in great numbers near the coast of Labrador. The birds hunt from high in the air, and when they see a fish they drop straight upon it with wonderful accuracy. When on land the bird is absurdly fearless, and the mother will remain on her nest, merely pecking at the hand that is put out toward her.

**Gansevoort**, *gans'voort*, PETER (1749-1812), an American soldier, born in Albany, N. Y. In the Revolutionary War he was appointed major of a New York regiment of patriot volunteers, was with the Montgomery expedition to Canada, and in August, 1777, defended Fort Schuyler against the attack of Saint Leger with a force of British regulars, Tories and indians. At the close of the war he was made brigadier general of New York state militia and later was given the same rank in the regular army.

**Gan'ymede**, in Grecian mythology, a Trojan youth of such great beauty that even the gods wondered at him. Jupiter sent his eagle to steal the boy from Mount Ida and carry him to Olympus, where he succeeded Hebe as cup-bearer to the gods.

**Gapes**, a disease of fowls, arising from the presence in the windpipe of small, parasitic worms, which cause the bird continually to open its beak and to cough. The parasites may be dislodged with a feather dipped in turpentine or by mixing a little epsom salts with the food.

**Gar**, the name of two different fishes, which are similar in structure and appearance. The marine garfish is round and slender, is from 3 to 5 feet long and has a stout bill, formed by a prolongation of the jaws. They are widely distributed in the warm oceans and live upon smaller fish. The fresh-water garfish has a long, nearly cylindrical body, covered with bony scales; the head has a long bill with a series of sharp teeth. This fish is common in lakes and rivers in the eastern part of the United States.

**Garage**, *gar-azh'*, an establishment where automobiles are stored and cared for. A public garage is sometimes called an automobile livery.

**Garbage**, *gahr'bij*, the waste matter, mostly of animal or vegetable origin, that comes principally from kitchens. This waste quickly decays if exposed to the air and becomes a source of disease. If it is thrown upon the ground, the water supply and the air in that vicinity are contaminated. In the country and in small towns a great deal of garbage is consumed by domestic animals and so rendered harmless, though if the troughs in which it is held are not frequently cleaned, the animals themselves may suffer. In large cities it becomes necessary to dispose of the garbage very quickly, and the difficulty of doing so has often resulted in neglect, and this has caused serious epidemics of disease. In large cities garbage cans are placed in the alleys, and into these the refuse from the houses is thrown. Every day this is

## Garcia

collected and hauled to its destination, the combustible parts are burned and the others are destroyed or disinfected. The removal of this garbage is so heavy an expense that many plans have been advocated for recovering some of the money by using the refuse to advantage. Several successful plans are in operation.

**Garcia**, *gahr the'ah*, MANUEL DEL POPOLO VICENTE (1775-1832), a celebrated Spanish vocalist and music teacher, born at Seville. He went to Paris in 1808 and sang Italian opera, meeting with the greatest success. His triumph was repeated in Italy some years later, and in 1817 he went to London, where he was accorded the highest honors. Later Garcia toured America, where he was warmly received. His fame rests principally, however, upon his principles of teaching, which are now acknowledged to be essential to the best musical instruction. He was the father of Maria Felicitas Malibran and was the teacher of many famous operatic singers.

**Garcia Y Iniguez**, *gahr se' a e e ne' ges*, CALIXTO (1836-1898), a Cuban patriot and soldier, born at Holguin, Santiago Province. He began the practice of law, but in 1868 he became a leader in the Cuban insurrection and later succeeded Maximo Gomez as commander in chief of the Cuban forces. At one time, being surrounded by a greatly superior force, he attempted to commit suicide rather than be captured, but was taken to Spain and imprisoned. Afterward he joined in another Cuban rebellion, was again captured and was taken to Spain, where he was held for fifteen years. He escaped in 1895 and came to the United States, where he engaged in filibustering. He succeeded in reaching Cuba and won important victories as one of the chiefs of the Cuban forces. After the occupation of Cuba by the Americans, he was appointed one of the commissioners to discuss Cuban affairs with the United States government at Washington and died during that conference.

**Garcilazo de la Vega**, *gahr'the lah'so da lah va' gah* (about 1540-1616), an historian of Peru, surnamed the Inca, son of one of the conquerors of Peru and a princess of the race of the Incas. His great work is the *Royal Commentaries of Peru*, valuable as almost the only account of ancient Peru. He wrote also a *History of Florida*.

**Garda**, *gahr'dah*, the largest lake in Italy, belonging to the Alpine region, 33 miles long and 3 to 11 miles broad. Its greatest depth is 1135 feet and it is 213 feet above sea level.

## Gardiner

Steamboats ply on it, and its shores are covered with villas.

**Garden City**, a popular name for Chicago.

**Gardening**, the art of growing vegetables, fruits and flowers (See HORTICULTURE). Gardens have been known since the earliest days of civilization, and from that time to the present gardening has been common among all civilized people. The most recent developments in gardening in the United States consist in the introduction of gardens into school grounds, and the extending of gardening to many homes and vacant lots in large cities through the agency of the schools and by garden associations co-operating with them.

**SCHOOL GARDENS.** While the school garden in the United States is of comparatively recent date, it has been in existence in Europe for a long time, and European countries now have over one hundred thousand school gardens. In Russia and several other countries, no school can receive aid from state funds unless it has a garden. A school garden is valuable for the following reasons: (1) It enables the pupils to gain a practical knowledge of farm crops; (2) it assists in giving the pupils practical training; (3) it affords the best opportunity for nature study; (4) it affords opportunity to train pupils to habits of industry and to develop the feeling of ownership and responsibility; (5) it affords one of the best means of assisting pupils to gain an all-around development; (6) it helps to keep the boys and girls on the farm.

In making a school garden the following suggestions will be found helpful: (1) Secure the consent and coöperation of the school directors; (2) have your plans well matured before beginning work on the ground; (3) so plan the work that it will be done out of school hours; (4) study and work with enthusiasm, make the garden succeed and it will be popular.

**Garden of Europe**, a name given to Italy.

**Garden of the Gods**, a beautiful region about five miles northwest of Colorado Springs, noted for the curious and grotesque shapes into which the colored sandstone has been worn. The garden has an area of 500 acres. Two huge masses of bright red sandstone, 330 feet high and separated just enough to allow a roadway between them, form the Gateway of the Garden of the Gods. Other famous rocks, whose names indicate their shape, are the Cathedral Spires, the Balanced Rock, the Seal and the Bear.

**Gar'diner**, MAINE, a city in Kennebec co., 6 mi. s. of Augusta, on the Kennebec River and



## Gardiner

on the Maine Central railroad. It has good water power and extensive lumber, paper and pulp mills, machine shops, foundries and various wood-working establishments. Ice is one of the most important exports. The place was settled in 1760, but remained a part of Pittston until 1803; it was chartered as a city in 1849. Population in 1910, 5311.

**Gardiner, SAMUEL RAWSON** (1829–1902), an English historian, born at Ropley, Hants, England, March 4, 1829, and educated at Winchester and Christ Church, Oxford. He also studied at Edinburgh and Göttingen and was for many years professor of modern history at King's College, London, and later at Oxford. He was appointed to succeed Froude as regius professor of modern history at Oxford, but declined. Gardiner was the author of numerous historical works of the highest value, of which the most important are *The History of England from the Accession of James I to the Outbreak of the Great Civil War*, *The History of the Great Civil War*, and *The History of the Commonwealth and Protectorate*. The last was not quite completed at his death. In these works he gave the most exhaustive and impartial discussion of the period that has yet been written. Another important work was *The First Two Stuarts and the Puritan Revolution*, which was a condensed but exceedingly valuable story of the same period. He also wrote a *Students' History of England* and *An Introduction to the Study of English History*, both of which are commonly used in England and America as text-books.

**Gardiner, STEPHEN** (1483–1555), an English prelate. Having become secretary to Wolsey and being a favorite with the king, he was dispatched to Rome in 1528 to forward Henry VIII's divorce and on his return was appointed successively secretary of state, archdeacon of Norwich and Leicester and bishop of Winchester. He also went on various embassies to France and Germany. He was imprisoned during the reign of Edward VI because of his opposition to the Reformation, but Mary made him lord chancellor and prime minister. He assisted at her coronation and at her marriage with Philip of Spain.

**Gard'ner, MASS.**, a town in Worcester co., 25 mi. n. of Worcester, on two lines of the Boston & Maine railroad. It has a large chair manufacturing industry. The town contains the Heywood library, an almshouse, a home for the aged, and Dunn and Crystal Lake parks.

## Garfield

It was incorporated in 1785. Population in 1910, 14,699.

**Gar'field, N. J.**, a borough of Bergen co., on the Passaic River, opposite Passaic, and on the Erie railroad. Chemicals, woolen goods, clothing and paper are the most important manufactures of the town. Population in 1910, 10,213.

**Garfield, JAMES ABRAM** (1831–1881), an American soldier and statesman, twentieth president of the United States, born in Orange, Ohio. His father died soon after the boy's



JAMES A. GARFIELD

birth, leaving his wife, unaided, to bring up her four small children. At the age of ten, young Garfield already added to his mother's income by work on neighboring farms and by driving horses on the Ohio Canal. In winter he made steady progress in the district school, and in 1849 he entered Geauga Seminary, at Chester, Ohio. He next went to the college at Hiram, Ohio, supporting himself meanwhile by tuition, and finally graduated at Williams College, Mass., in 1856. Returning to the college at Hiram, he became its president in 1857, at the same time preaching and studying law.

He was elected to the state senate in 1859, and on the outbreak of the Civil War he received the command of a regiment of Ohio volunteers. In December, 1861, he was given a brigade.

## Gargle

with orders to drive the Confederates out of eastern Kentucky, and he won the battle of Middle Creek, Jan. 10, 1862, from which his commission as brigadier general was dated. He was promoted to be major general for gallantry at Chickamauga, Sept. 19, 1863, but resigned his command to enter Congress, at the age of thirty-two. He sat in Congress, rendering valuable assistance in military and financial questions, until 1880, and he was a leader of the Republican party in the House.

In January, 1880, he was elected United States senator, and in June of the same year he was named presidential candidate by the Republican convention at Chicago. Garfield's nomination came as a surprise to his party and was simply the result of a compromise between the supporters of Grant and Blaine. He proved, nevertheless, a strong candidate, regardless of precedent delivered speeches in his own behalf and finally defeated General Hancock by a narrow majority of the popular vote, but by 215 to 155 electoral votes. He identified himself with the cause of civil-service reform and thus increased the antagonism of the Conkling-Grant faction and caused the resignation of Conkling and Platt of New York from the Senate. On the morning of July 2, 1881, as he was setting off to witness the closing exercises of his old college, he was shot down by a disappointed office-seeker, Charles Guiteau. For weeks he lingered between life and death, but in September he died near Long Branch, N. J. where he had been taken in the belief that the change of air might do him good. He was buried in Cleveland, Ohio, where a beautiful mausoleum has been erected. A subscription was immediately started for the family, and in a short time over \$350,000 had been subscribed. When Guiteau was brought to trial his advocates attempted to show that he was insane, but convincing proof was lacking, and he was hanged in June, 1882. Consult Coffin's *Life of Garfield*.

**Gargle**, *gahr'g'l*, a wash for the throat. In using a gargle the head should be thrown well back, so as to keep the liquid in contact with the throat; then by expelling the air from the lungs through the liquid it is churned about and the throat is thoroughly washed. Care should be taken not to swallow the gargle, which usually contains drugs too powerful for the stomach.

**Gar'goyle**, in architecture, a spout jutting out from the roof gutter of a building to discharge water. Gargoyles were in use in ancient

## Garibaldi

Egypt and in classic architecture, where they were often made of marble, imitating in form a lion's or a boar's head. In medieval times, especially in Gothic architecture, they were used in all conceivable forms and sizes.

**Garibaldi**, *gah're bahl'de*, GIUSEPPE (1807-1882), an Italian patriot and hero. He received little education and for a number of years was a sailor on various trading vessels. In 1834 he became a member of the Young Italy party, was condemned to death for his share in the



GIUSEPPE GARIBALDI

schemes of Mazzini, escaped to Marseilles, took service in the fleet of the bey of Tunis and finally went to South America. In the service of the Republic of Rio Grande against the Brazilians he became known as a brilliant leader, and with his famous Italian legion he subsequently gave the Montevidians effective aid against Buenos Ayres.

In 1848 he returned to Italy, raised a band of volunteers and harassed the Austrians until the cessation of hostilities and the reestablishment of Austrian supremacy in Lombardy. He came to the United States and was for some years in command of a merchant vessel. He then purchased a part of the small island of Caprera, off the north coast of Sardinia, and made this his home for the rest of his life. Latterly the subscriptions of his admirers enabled him to become owner of the whole island. In the war of 1859, in which Sardinia recovered Lombardy, Garibaldi and his Chasseurs of the Alps did splendid service; and on the revolt of the Sicilians in 1860 he crossed to the island and



wrested it from the king of Naples, after a fierce struggle. He then recrossed to the mainland and occupied Naples, where he was proclaimed dictator of the Two Sicilies. It was now feared that Garibaldi might prove untrue to his motto, "Italy and Victor Emmanuel"; but he readily acquiesced in the annexation of the Two Sicilies to Italy and, declining all honors, retired to his island farm. In 1870 he gave his services to the French republican government against the Germans and rendered valuable assistance in the southeast. At the end of the war he was elected a member of the French assembly, but speedily resigned his seat and returned to Caprera. In January, 1875, Garibaldi took his seat in the Italian parliament, but he did not distinguish himself politically.

**Garland**, HAMLIN (1860- ), an American novelist and poet. Among his novels, with their realistic pictures of western life, are *The Rose of Dutcher's Coolly*, *The Eagle's Heart* and *Captain of the Gray Horse Troop*, while of his other works may be mentioned his sympathetic biography of Ulysses Grant; his volume of criticism called *Crumbling Idols*, and his *Prairie Songs*, a volume of verse. As a short story writer Garland's rank is among the best, and *Main Traveled Roads* is a volume in his happiest style.

**Gar'lic**, a hardy perennial, allied to the onion, indigenous to the south of Europe and forming a favorite condiment among several nations. The leaves are grass-like and hollow, like those of the common onion. The stem is about two feet high; the flowers are white, and the root is a compound bulb, consisting of several smaller bulbs, commonly denominated *cloves*, enveloped by a common membrane. Garlic has a strong, penetrating odor and a pungent, acrid taste.

**Gar'net**, a mineral, occurring in twelve-sided crystals, usually of a dark red or cinnamon color, but sometimes white, green, brown or black. Because of their composition, garnets are classified into three groups: Those containing iron are known as *iron garnets*; those containing aluminum are known as *aluminum garnets*, and those containing calcium are known as *calcium*, or *chromium*, *garnets*. The aluminum garnets are usually the best; and the best of these are classified among the precious stones and when polished form beautiful gems. Jewelers, however, classify garnets as Syrian, Bohemian or Cinghalese, not necessarily because they came from these localities, but because of their rela-

tive value and fineness, those of the first quality being named Syrian and the second Bohemian. The Bohemian garnet is usually of a dark red and is the one most frequently seen as a gem in the United States. Garnets of the gem variety have been made artificially in Paris.

**Gar'nishment**, the process by which the claims or assets of a defendant in the hands of a third person are seized and used in satisfying the plaintiff's claim. This process is closely regulated by statute. It is most commonly used to secure the payment of a debt by seizing the wages of a debtor.

**Gar'rick**, DAVID (1717-1779), the most famous of English actors. He was born at Hereford, was given an education at a grammar school in London and after an unsuccessful attempt to learn the wine trade in Lisbon became a pupil of Samuel Johnson, with whom he remained for seven years. In 1736, with Johnson, he went to London and there studied law for a time. He had always had a leaning toward the stage, however, and in 1741 he appeared for the first time. As Richard III he made, under an assumed name, a great triumph, and from that time on his name was connected with the production of Shakespearean plays. Garrick presented these dramas without the barbarisms and crudities which had crept into them, and his work constituted a virtual revival of Shakespearean plays. Hot-tempered and jealous, he constantly made enemies among his colleagues and the critics, but his reputation as an actor remained unimpaired until his retirement from the stage in 1776. Among the dramas which Garrick wrote, the best is *The Lying Valet*.

**Gar'rison**, WILLIAM LLOYD (1805-1879), an American journalist and reformer, the founder of the antislavery movement in the United States. He was apprenticed to a shoemaker, but later became a compositor on the Newburyport *Herald*. In 1827 he became editor of the *National Philanthropist*, the first American temperance journal, and afterwards of a journal in support of the election of John Quincy Adams. With Mr. Lundy, a Quaker, he then started at Baltimore a paper called *The Genius of Universal Emancipation*, and his open denunciations of slave traders led soon to his imprisonment for libel. On his release he began lecturing in Boston and started *The Liberator*, a weekly journal, which he published with the aid of one assistant and a negro boy. In 1832 appeared his *Thoughts on African Colonization*, and in

the same year he established the American Antislavery Society. He subsequently visited England, where he was welcomed by Wilberforce, Brougham, Buxton and others. Constant threats were made that if he did not discontinue *The Liberator* he would be assassinated, and in 1835 he was saved with difficulty from a Boston



WILLIAM LLOYD GARRISON

mob; but his principles made steady progress until 1865, when the Antislavery Society was dissolved, with its work accomplished. A volume of his sonnets and one of selections from his writings have been published.

**Garter**, ORDER OF THE, the highest and most ancient order of knighthood in Great Britain, supposed to have been founded about 1344. Until the reign of Edward VI, the common title of the order was the Order of Saint George, and it still bears this title as well as that of the Garter. The emblem of the order, the garter, a dark-blue ribbon edged with gold, and bearing the motto *Honi soit qui mal y pense*—"Shame be to him who thinks evil of it," is worn on the left leg just below the knee.

**Garter Snake**, a name loosely applied to a number of different reptiles, which are found in various parts of North America. One species is found in all parts of the country. When mature it is about three feet long and is striped with yellow and black. Though its bite is quite harmless, it will rush at a pursuer with open mouth and present quite a terrifying appearance. It brings forth its young alive and

watches over them with great care, and it seems well established that the mother snake will allow her young to run into her mouth for protection until the danger has passed by.

**Gary, IND.**, a city of Lake co., 23 mi. s. e. of Chicago, on Lake Michigan and on the Lake Shore & Michigan Southern and other railroads. The city is the site of the largest and most perfect steel plant in the world. Building operations were begun in 1906 by the Indiana Steel Company, a subsidiary company of the United States Steel Corporation. The plant contains exclusive ore docks on the lake shore, and furnaces whose combined capacity exceeds 2,500,000 tons of steel a year. There are also extensive car shops and other industries under separate management. Population in 1910, 16,802.

**GARY SCHOOL PLAN**, a course of study developed by Wm. A. Wirt, superintendent of public schools. It is the result of special conditions—the lack of equipment, and a large foreign population. The school day for pupils and teachers is eight hours. One-half of this time is given to the usual studies, one-fourth to domestic science, music, and manual arts, and one-fourth to physical training, games and plays. Above the third grade each subject is taught by a special teacher. There is no separate high school organization, and throughout the twelve-year course the pupil is allowed more freedom of action and thought than is customary in school. Another important feature is the small equipment needed, for while one portion of the children is on the playground another is in the classroom.

**Gas**, a term originally synonymous with **air**, but afterward restricted to such bodies as were supposed to be incapable of being reduced to a liquid or solid state. Under this supposition gas was "a term applied to all permanently elastic fluids or airs differing from common air." After the liquefaction of gases by Faraday, the old distinction between gas and vapor, namely, that the latter could be reduced to a liquid or solid condition by reduction of temperature and increase of pressure, while a gas could not be so altered, was no longer tenable, so that the term has resumed nearly its original signification and designates any substance in an elastic, air-like state. Gases appear to be in a continued state of compression, for when left unconfined they expand in every direction to an extent which has not yet been determined. In respect of this indefinite expansiveness, all gaseous bodies obey, more or less strictly, two laws. The first, known as the law of Boyle and Mariotte,



given first by Robert Boyle in 1662 and then by Mariotte in 1676, is, *The volume of a given mass of gas varies inversely with the pressure to which the gas is subjected*; or, in other words, the density of a given mass of gas is in direct proportion to the pressure to which the gas is subjected. The second, or Charles's law, may be stated as follows: *The volume of gas maintained under constant pressure increases for equal increments of temperature by a constant fraction of its original volume; and this fraction is the same whatever is the nature of the gas.* There is, however, no known gas that obeys these two laws perfectly.

The liquefaction of gases is effected by the application of cold or pressure, or of the two combined. For any given pressure there is a particular temperature at which the gas liquefies. At a certain point, however, called by Andrews the *critical point of temperature*, the distinction between liquid and gas appears completely lost. At and above this temperature no pressure that can be applied will convert the gas into the form of a liquid, even though the volume is diminished by pressure so much as to make the density of the gas greater than that of the liquid obtained at lower temperatures. By 1878 all gases had been liquefied.

The power of motion inherent in all parts of air-like matter is accounted for by the *kinetic theory of gases*, according to which a gas consists of an enormous number of molecules moving about with very great velocity. Great as is their number, however, the molecules are sparsely distributed through space, in comparison with their distribution when the substance is in the solid or liquid condition. A molecule of a gas flying about moves on in a straight line till it meets another molecule, or till it touches a side of the containing vessel. Meeting another molecule, the two turn each other aside, just as two billiard balls when they come into collision are both deflected from their previous paths. Passing thence, each flies on in a straight line till it meets a fresh molecule, and each is again deflected. When the molecules strike on the side of a vessel that contains the gas, they rebound as a billiard ball **does** from the cushion of the billiard table; and the perpetual shower of molecules that strike and rebound from the sides give rise to the phenomenon of gaseous pressure, just as an umbrella held out in a hailstorm is pressed downward, owing to the numerous impulsive blows that act upon it. When the temperature of a gas is raised the energy of the molecules is in-

creased. They strike with greater velocity, and the number of blows on the surface of the vessel is also increased. The pressure is therefore greater. The law of Dalton or Charles is easily shown to be a consequence of the kinetic theory. Boyle's law also follows very simply from it; for if we diminish the volume of the containing vessel to one-half, one-third, or to any other fraction of its original volume, we increase the number of molecules in a given space, a cubic inch for instance, in the same ratio. Consequently, the number of impacts on a square inch of the surface of the containing vessel will also be increased in the same ratio, and the pressure will thus be increased in that ratio, too.

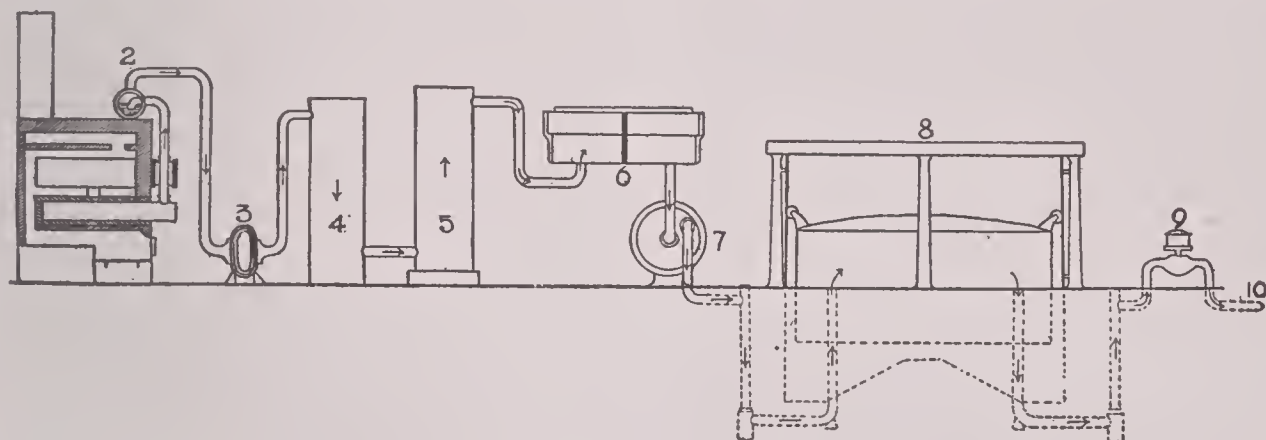
**Gas, ILLUMINATING**, a gas made from bituminous coal or oil and used for illuminating purposes. Illuminating gas was first successfully used by William Murdoch, a Scotchman, in 1792. In 1805 he introduced it into the cotton mills of Manchester, England. It was first used in Paris in 1799, and in London in 1810. It was introduced into the United States at Baltimore in 1821. The next year it was used in Boston, and in 1825 was introduced into New York.

Illuminating gas in general use is known as coal gas or water gas, according to the method employed in its manufacture. Both varieties when manufactured contain many impurities, consisting of tar, sulphur compounds, ammonia, carbon dioxide and water vapor. All of these must be removed before the gas is suitable for use, and the greater part of the apparatus in gas works is for the purpose of removing these impurities.

**COAL GAS.** Coal gas is made by distilling bituminous coal, those varieties containing a large proportion of volatile matter being the most desirable. In the United States the best gas coal is obtained near Pittsburg, Pa., and in West Virginia. The apparatus for the manufacture of coal gas, which is shown in the illustration, consists of the following parts: The furnace, 1, containing the retorts; the hydraulic main, 2, into which the gas flows from the retorts; the exhaustor, 3; the condenser, 4; the scrubber, 5; the purifier, 6; the station meter, 7; the holder, 8; the governor, 9; the main, 10. The retorts are made of fire clay and are flat on the bottom and round on the top. They are usually nine feet long, twenty-six inches wide and sixteen inches high and have on the front end a cast iron mouthpiece fitted with a gas-tight door, also a delivery tube through which the gas flows. The retorts hold from 250

to 350 pounds of coal each. They are placed on shelves in the furnace so that the fire will surround them. There are usually six in a furnace. The delivery pipe leads to the hydraulic main, which is a large U-shaped pipe containing water.

The retorts are charged with coal, then closed and heated to redness. As the coal distills, the gas flows to the hydraulic main, where it passes through water and loses some of its tar and ammonia. It is drawn from the hydraulic main and forced through the remaining parts of the apparatus by the exhauster, which is a large gas pump operated by steam power. The condenser (4) is a large cylinder containing coils of iron pipe through which cold water is kept flowing. As the gas passes through this cylinder it is cooled and loses its tar and water vapor. From the condenser it goes to the scrubber (5), which is another cylinder filled with coke, brushes, wooden grids or other porous material,



over which a shower of water constantly flows. The gas enters the scrubber at the bottom and as it passes up through the cylinder it is brought in contact with the water, which absorbs any ammonia and deposits any tar that may have escaped the condenser. From the scrubber the gas passes to the purifier (6), which is a chamber containing layers of freshly slaked lime or of oxide of iron. These are placed one above the other on floors containing many small openings. As the gas is forced up through the lime or oxide, these compounds absorb any sulphur compounds which it may contain. It is now ready for use and passes through the station meter (7), which measures and records the number of cubic feet passing into the holder (8). The holder is a large cylindrical tank, made of thin iron plates having a dome-shaped top and open at the bottom. It is placed in a cistern of water from which it rises as it is filled with gas. The tank is surrounded by an iron frame, called the *guide*

*frame*, upon the pillars of which guide pulleys run as the tank moves up and down. From the holder the gas passes through the governor (9), which is a device for controlling the pressure, to the main (10), from which it is distributed to the consumer. As the gas enters the building in which it is to be used, it passes through a meter which registers the number of cubic feet consumed.

**WATER GAS.** Water gas is now in very general use in large cities. It is made by mingling the vapor of crude petroleum with steam and heating the mixed vapors to a high temperature. It contains the same impurities as coal gas and for its manufacture passes through the same process of purification. It is more cheaply made than coal gas and in the main is more satisfactory to the consumer.

**OIL GAS** is made by running oil or petroleum through red-hot tubes. This is the gas generally

used in lighting railway cars. It is stored in iron cylinders, under a pressure which enables each cylinder to contain a supply sufficient for several days.

**Gas'cony**, an old duchy in France, between the River Garonne, the sea and the Pyrenees Mountains. It composes three departments and parts of four others. The Gascons, who are of mixed Basque and Gothic descent, used to have the character of being brave, faithful and peculiarly tenacious of purpose, but much given to boasting, whence the word *gasconnade*.

**Gas Engine**, an engine in which the motive power is produced by the explosion of gas in a cylinder carrying the piston. Illuminating gas, natural gas and that from gasoline, naphtha or other petroleum products are used, but by far the largest number of engines use gasoline gas and are known as *gasoline engines*. The important parts of a gas engine are the cylinder, the piston, the connecting rod, the crank, the fly



wheel, the igniting apparatus and the necessary valves for the admission and escape of gas from the cylinder.

In the common type of engine the action is as follows: The proper quantity of gas, mixed with air, is admitted to the cylinder. By means of the igniting apparatus, this is exploded by an electric spark, thus throwing the piston forward with a pressure varying from 100 to 150 or 175 pounds to the square inch. As the piston moves forward it creates a partial vacuum in the cylinder, and more gas is drawn in. On the return of the piston this is compressed in the head of the cylinder, where it is exploded, giving the piston another forward movement. With the second return of the piston the exhaust valve is opened and the burned gas is forced out. It requires two revolutions of the engine shaft to complete the cycle. Because of the irregular application of power, the gas engine is compelled to carry a heavy fly wheel, in order to maintain a uniform rate of motion. A governor attached to this wheel regulates the supply of gas and the number of explosions in the cylinder. Gas engines are used for a great variety of purposes and are constructed of nearly all sizes up to 700 horse power. A portable pattern, built on a wagon so that it can be hauled from one place to another, is of great advantage to farmers. The gas engine is simple in construction, does not require a boiler, can be used without any danger of explosion and can be operated without the services of a skilled engineer. See STEAM ENGINE.

**Gas'kell**, ELIZABETH CLEGHORN (1810-1865), a British novelist, daughter of William Stevenson. She married in 1832 the Rev. William Gaskell, a Unitarian minister at Manchester. Her works comprise many novels, among them *Ruth*, *Cousin Phillis* and *Cranford*, this last a classic. Her *Life of Charlotte Brontë* is one of the finest of English biographies.

**Gasoline**, *gas'oleen*, a highly inflammable liquid produced in the distillation of crude petroleum or by the distillation of bituminous coal. It is colorless, volatile and highly explosive. Gasoline is used in gas engines, where, by means of a carburetor, it is transformed into a gas that furnishes the power. See PETROLEUM.

**Gas Tar**. See COAL TAR.

**Gastric Juice**, a clear, colorless, acid fluid, with a salty taste, secreted by the mucous membrane of the stomach and acting as the chief agent in the process of digestion. Its most active elements are hydrochloric acid, pepsin and rennin. The first gives the juice its acidity,

makes the other two elements more active, prevents decaying of the food, dissolves proteids and softens connective tissue; the rennin curdles milk; the pepsin changes proteids into peptones. Gastric juice does not act on oil or starch. After the food has become thoroughly mixed with the juice of the stomach, it is a thick, sticky substance, called *chyme*, ready to pass into the intestines. The amount of gastric juice secreted daily in the human adult is estimated to be fourteen pounds or more, but as it is continually re-absorbed, there is no great quantity present at any one time.

**Gastri'tis**, a disease which has its seat in the mucous membrane of the stomach. It takes several forms, in all of which, however, the symptoms are generally similar—a slight pain in the stomach, accompanied by severe headache, slight fever and often nausea. Diet and careful hygiene are found to constitute the most successful treatment.

**Gas'tropod** or **Gas'teropod**, one of a class of mollusks which have a single shell, although some of the group are wholly without shells. See SLUG; SNAIL; MOLLUSCA.

**Gates**, HORATIO (1728-1806), an American officer during the Revolutionary War, born in Essex County, England. He entered the English army and was with Braddock when the latter was defeated in 1755. On the conclusion of peace he purchased an estate in Virginia, where he lived until the Revolutionary War. He was appointed adjutant general by Congress, with the rank of brigadier general, and at the head of the American Army of the North he compelled the British general Burgoyne to surrender his whole army at Saratoga (1777). The chief credit for this victory belongs, however, rather to Schuyler, Arnold and Morgan than to Gates. In 1780, after the capture of General Lincoln, Gates received the chief command of the southern districts, but was defeated two months later by Cornwallis at Camden. He was then superseded by General Greene and brought to court martial, but was finally acquitted and was reinstated in his command in 1782, after the capture of Cornwallis. At the close of the war he retired to his farm in Virginia; in 1790 he removed to New York, where he died.

**Gates**, THOMAS, Sir (?-about 1621), the first governor of Virginia Colony under the Virginia Company. He was born in Devonshire, England, entered the army and saw service under Sir Francis Drake. He was one of the principal promoters of the Virginia Company in 1606 and

was placed in joint command, with Somers and Newport, of the fleet that sailed for America in 1609 to relieve the distressed colony. His vessel was wrecked on the Bermudas, but two new ships were constructed, and Gates arrived at Jamestown in 1610, just at the close of the famous "starving time." Gates yielded to the entreaties of the colonists and put them aboard ship for England, but turned back on account of the arrival of Lord Delaware. He made a later trip to England, where he served in responsible positions.

**Gath** (wine press), one of the five royal cities of the Philistines, which, from its situation on the borders of Judah, was of much importance in the wars of the Jews and Philistines. It was the native town of Goliath, and was successively captured by David, Hazael and Uzziah, who dismantled it. The site cannot be determined with certainty, but it is sometimes identified with Tell-es-Sâfieh, between Ekron and Ashdod.

**Gatineau**, *gah te no'*, a river of Canada, in Quebec province, the largest affluent of the Ottawa. It rises in several lakes and flows almost due south, entering the Ottawa nearly opposite Ottawa City. It is not navigable more than five miles above the Ottawa, except by canoes, but its rapid waters are well stocked with fish and are available as water power. Its length is 400 miles.

**Gat'ling**, RICHARD JORDAN (1818-1903), an American inventor, born in North Carolina. He showed mechanical skill at an early age and perfected several machines for the simplification of processes in cotton manufacture. His principal invention, however, was the revolving gun now known as the Gatling gun. See MACHINE GUN.

**Gauchos**, *gow'choze*, natives of the Pampas in the La Plata countries in South America, of Spanish descent. They are noted for their spirit of wild independence, for horsemanship and for their expert use of the lasso. Their mode of life is rude and uncivilized, and they depend for subsistence chiefly on cattle raising.

**Gau'dea'mus**, (Latin, "let us rejoice"), the title and first word of a Latin song, popular among students in Germany and America. It dates perhaps from the fifteenth century.

**Gauge** or **Gage**, *gaje*, STEAM and WATER, the instruments fixed to engine boilers for registering the force of the steam and the level of the water. The steam gauge consists of a cylindrical metallic box with a dial in front, over which a needle moves. A tube from the boiler connects with a

movable piece of metal, which acts against a spring, gauged to indicate the pressure to the square inch in pounds. The higher the pressure, the more the spring is compressed. The needle is connected with the spring by a mechanism which causes it to move over the dial, upon which the pressure is marked in pounds. The water gauge is a vertical glass tube or flat case, communicating above and below with the boiler. Gauge cocks are sometimes used instead of or in addition to the tubes, for enabling the engineer to verify the level of the water. See BOILER.

**Gaul**, in ancient geography the country of the Gauls, the chief branch of the great original stock of Celts (See CELTS). It extended at one time from the Pyrenees to the Rhine and included also a part of Italy. Hence it was divided into Gaul on this side (the Roman side) of the Alps, or *Cisalpine Gaul*, and Gaul beyond the Alps, or *Transalpine Gaul*. Latterly the former was regarded quite as part of Italy, and the name was restricted to Transalpine Gaul, or the country corresponding nearly to modern France. Julius Caesar found Transalpine Gaul divided into three parts: Aquitania, extending from the Pyrenees to the Garonne; Celtic Gaul, from the Garonne to the Seine and Marne, and Belgic Gaul, in the north, extending to the Rhine.

Migrations among the Gauls about 397 B. C. first bring the Gallic nation into the region of history. Having crossed the Alps, they fell upon the Etruscans, defeated the Romans at Allia (390 B. C.) and sacked and burned Rome. More than a century after the burning of Rome, the eastern Gauls made three destructive irruptions into Macedonia and Greece. Several tribes pursued their course into Asia Minor, where, under the name *Galatians*, they long retained their national peculiarities. After these migrations the Gauls along the banks of the Danube and in the south of Germany disappeared.

The Celts of Cisalpine Gaul continued formidable to Rome until after the first Punic War, when the nation was compelled as the result of a war of six years to submit to the Romans (220 B. C.). When Hannibal marched on Rome they attempted to shake off the yoke; but the Romans, victorious over the Carthaginians, reduced them again to submission. In the years 128-122 B. C. the Romans conquered the southern part of Transalpine Gaul, along the sea from the Alps to the Pyrenees, and here established their dominion in what was called the Province, a name that still exists as Provence. When Julius Caesar was appointed to the proconsulship over



## Gauntlet

the countries bordering on Gaul, he resolved to subject all Gaul and executed his purpose in less than nine years, 58-50 B. C., in eight bloody campaigns.

**Gauntlet** or **Gantlet**, *gahnt'let*, a glove, usually made of leather and covered with iron, which was used by medieval knights. The metal parts were so joined that the hand could open and close. To throw down the gauntlet before an antagonist was a common method of declaring a challenge.

**Gaur**, *gowr*, or **Gour**, one of the largest of the ox tribe, remarkable for the height of its spinal ridge and for its white "stockings," which reach above the knee. It is so fierce when aroused that neither tiger, rhinoceros nor elephant dares attack it. The hide on the shoulders and hind quarters is sometimes nearly two inches in thickness, even after being dried, and it is, therefore, much valued for shields. The gaur is an inhabitant of India, and it is said that it cannot be domesticated.

**Gautama**, *gow'tah mah*. See BUDDHA.

**Gautier**, *go tyay'*, THEOPHILE (1811-1872), a French poet, novelist and critic. His first volume of poems, published in 1830, marked him as a romanticist of the school of Hugo. His first great success was secured by publication of the romance *Mademoiselle de Maupin*. He was afterward engaged as theatrical and art critic on the *Revue de Paris*, the *Artiste*, the *Moniteur* and the *Journal Officiel*. Among the most interesting of his productions may be ranked his *Journeys in Spain; Italy and Constantinople*, narratives of travel; *Captain Fracasse* and *Handsome Jenny*, novels; the brilliant short stories, *Fortunio* and *Jettatura*; his criticisms, collected in *History of Dramatic Art in France*, and *Enamels and Cameos*, his best volume of verse, on which his reputation chiefly rests.

**Gavarni**, *ga vahr nee'*, (1804-1866) the assumed name of Sulpice Paul Chevalier, a celebrated French caricaturist, born at Paris. His success came after 1832, when he produced some notable illustrations in several journals of Paris. Most of his subjects are taken from low life, as seen in the Bohemian quarters of Paris, and they are represented with force and vivacity. In 1847 he visited England, and the sketches which he sent from Saint Giles, London, to *L'Illustration* created an immense sensation. He afterward illustrated Eugene Sue's *Wandering Jew*, Balzac's novels and other works.

**Ga'vial**, the Indian crocodile, characterized by the narrow, almost cylindrical jaws, which

## Gay

form an exceedingly long muzzle. The teeth, about 120 in number, are all equal in length, and the feet are completely webbed. The males can be distinguished from the females by the



GAVIAL

large lump upon the snout, in which the nostrils open. The only living species, which sometimes reaches a length of twenty feet, is found in southern and eastern Asia, especially in the Ganges. It feeds on fishes and other small prey.

**Gavotte**, *ga vot'*, a musical air for a special dance, consisting of two strains, each of four or eight bars, in  $\frac{2}{4}$  or  $\frac{4}{4}$  time, the starting notes occupying half a bar. Like the minuet, it has been introduced for free treatment into complex musical compositions. The name is said to be derived from the Gavots, the inhabitants of the Gap, in France.

**Gay**, JOHN (1685-1732), an English poet. In his youth he was apprenticed to a silk mercer in London, but he soon gave up that work. In 1711 he published his *Rural Sports*, which was followed by several pastoral poems, written under the influence of Pope. In 1715 appeared his burlesque drama of *What d'ye Call It?*, followed by *Trivia, or the Art of Walking the Streets of London*. His next piece, a farce entitled *Three Hours after Marriage*, failed entirely, but *The Captive*, a tragedy produced some years later, met with some success. His reputation was greatly increased by the publication of his *Fables* in verse, but it was not until the appearance of the *Beggar's Opera* that he became really famous. This was first acted in 1727, at Lincoln's Inn Fields, where it ran for sixty-three nights, but the lord-chamberlain refused to license for performance a second part, entitled *Polly*.

**Gay**, SIDNEY HOWARD (1814-1888), an American journalist and author, born in Hingham, Mass. In 1842 he joined the staff of the *New York Tribune*, of which, from 1862 to 1866, he was managing editor. He occupied the same position on the *Chicago Tribune* for three years and was later connected with the *New York Evening Post* as an editorial writer. He collaborated with William Cullen Bryant in the writing of *A Popular History of the United States*, but he practically wrote all of that work.

**Gay-Lussac**, *gay'lu sak'*, LOUIS JOSEPH (1778-1850), an eminent scientist, educated at the *Ecole Polytechnique*, Paris, in which institution he became assistant chemist upon his graduation and eight years later was appointed professor of chemistry. He was one of the most noted scientists of his day and made many important discoveries, some of which revolutionized the theories and practices of chemistry. Perhaps the most important of all was the discovery that oxygen and hydrogen unite in proportions of one to two to form water. This led to the discovery and announcement of the law of volumes, which is one of the most important discoveries in the domain of chemistry (See **CHEMISTRY**). He gave attention to the application of chemical laws and theories to practical purposes. Owing to the great benefits resulting from his studies and discoveries, Gay-Lussac was the recipient of many honors. He also occupied important educational and government positions and in 1839 was made a peer of France.

**Gaynor**, WILLIAM JAY (1851-1913), an American jurist, born in Whitestown, N. Y., and educated at Whitestown Seminary and in Boston. He began his career as a journalist, but was admitted to the bar in 1875. He was very successful in his practice and appeared in many important cases. In 1903 he was elected judge of the Supreme Court of New York and in 1909 he was elected mayor of Greater New York.

**Gaza**, *gah'za*, an ancient town of Syria, 3 mi. from the Mediterranean and 50 mi. s. s. w. of Jerusalem. It was once the most important city of the Philistines, who had conquered it from Egypt. Later it was taken by Alexander the Great, and it was destroyed in 96 B. C.; but it continued a center of Greek culture until nearly 700 A. D. The modern city of Ghazze is an important station in the caravan communication between Egypt and Syria. Population in 1911, about 40,000.

**Gazelle**, *ga zel'*, a small, graceful antelope, of which there are about twenty-three species. The

color of its back is a light fawn, deepening into dark brown in a wide band which edges the flanks and forms a line between the upper portions of the body and the pure white of the abdomen. The eye of the gazelle is large, soft and lustrous. Both sexes are provided with horns, which are round, black and about thirteen inches long. It seems to be confined to the north side of the Atlas Mountains, Egypt, Abyssinia, Syria, Arabia and South Persia. The common gazelle, sometimes called the *ariel*, or *dorcas*, is brown in color. It is easily tamed and is a great favorite as a pet. Other species are Loder's gazelle, Grant's and the Indian chinkara, or ravine deer. See ANTELOPE.

**Gazette**, *ga zet'*, (from *gazzetta*, a small Venetian coin, which was the price of the first newspaper), a newspaper, especially an official newspaper. The first gazette in England was published at Oxford in 1665. On the removal of the court to London the title of *London Gazette* was adopted. Later this paper became the official organ of the government. The term is frequently applied to newspapers in the United States. See NEWSPAPER.

**Gearing**, *geer'ing*, in machinery, the parts, collectively considered, by which motion communicated to one portion of a machine is transmitted to another, generally a train of toothed wheels. There are two chief sorts of wheel gearing, *spur gearing* and *beveled gearing*. In the former the teeth are arranged round either the concave or convex surface of the wheel, and are of equal depth throughout. In *beveled gearing* the teeth are placed upon a beveled surface round a wheel, which, if the slope of the bevel were continued, would form a cone, the teeth sloping similarly. Spur gearing is used when the axles of the wheels are parallel, and beveled gearing is used when the axles are at right angles to each other.

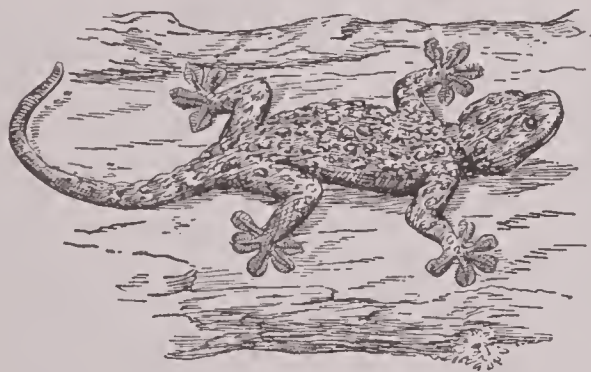
**Geary**, *ga'ry* or *ge'ry*, JOHN WHITE (1819-1873), an American soldier and politician, born in Westmoreland County, Va., and educated at Jefferson College. He engaged in commercial and engineering work and during the Mexican War served in the United States army, becoming colonel. At the close of the war he settled in San Francisco, became its first mayor under the American system of government and took a conspicuous part in preparing the state for admission to the Union. Later he returned to Pennsylvania and in 1856 was appointed territorial governor of Kansas. There, by his tact and firmness, he brought order out of confusion and



dissension, but, disgusted at his lack of support from the Federal government, he resigned upon the accession of Buchanan. During the Civil War he served with distinction in the Army of the Potomac, fought at Cedar Mountain, Chancellorsville, Gettysburg, Lookout Mountain, and with Sherman upon his march to the sea, and was appointed military governor of Savannah after its capture. At the close of the war he was brevetted major general. In 1866 Geary became governor of Pennsylvania as a Republican and was reelected in 1869. He died a few days after the expiration of his term.

**Geber**, *ga'bur*, an Arabian chemist or alchemist, often designated the father of chemistry, who flourished during the eighth century. He was acquainted with nearly all the chemical processes in use down to the eighteenth century. His writings describe various kinds of furnaces and other apparatus, besides distillation and other chemical processes; the purification, composition and properties of the metals then known—gold, silver, copper, lead, tin and iron—and the functions of mercury, sulphur and arsenic. He is the reputed author of an immense number of works, as well on metaphysics, language and astronomy, as on chemistry.

**Geck'o**, a name common to the members of a family of lizards that are active by night and are characterized by a general flatness of



GECKO

their bodies and heads, which have a somewhat triangular shape. The body is covered on the upper part with numerous round warts; the feet are rather short, the toes of nearly equal length and furnished with flattened sucking pads, by means of which the animals can run up a perpendicular wall or even across a ceiling after the manner of flies. The gecko receives its name from its peculiar cry. Species are common in North Africa and South Europe.

**Geez Language.** See ETHIOPIAN LANGUAGE.

**Gehen'na** or **Valley of Hin'nom** lies southwest of Jerusalem and was celebrated as

a place of idolatrous rites and where children were sacrificed to Molech. After the time of Josiah, king of Judah, it became a place for sewage and filth. In the time of Christ the word Gehenna was synonymous with hell, the place of the lost.

**Geibel**, *gi'bel*, EMANUEL (1815–1884), a German poet. He studied at the universities of Bonn and Berlin and resided a year or two in Greece. He published in 1840 his first collection of poems, which reached its hundredth edition in 1884. From 1852 to 1869 he was honorary professor of aesthetics and poetry in the University of Munich, but spent his latter days in his native town. He wrote *Brunhild*, a tragedy; *The Loreley*, an opera, and several other plays, but his fame rests on his lyrics, which are immensely popular.

**Geikie**, *gee'ky*, ARCHIBALD, Sir (1835– ), a British geologist, born in Edinburgh. After graduation at the University of Edinburgh he became a member of the Geological Survey of Scotland, of which he was later made director. Having served for eleven years as Murchison professor of geology and mineralogy in Edinburgh, he became director of the Museum of Practical Geology in London. Geikie is considered one of the highest geological authorities and has written extensively on the subject of physiography and geology, his text-books being used in both England and the United States. He was elected president of the Geological Society of London and also served as president of the British Association for the Advancement of Science. In 1897 he came to America and delivered a series of lectures at Johns Hopkins University. Among his important works are *A Text-book of Geology*, *Ancient Volcanoes of Britain* and *The Foundations of Geology*.

**Geissler's**, *gise'lurs*, **Tubes or Vacuum Tubes**, tubes made of very hard glass, containing highly rarefied gases, as air, oxygen or nitrogen. Each end of the tube has a platinum wire sealed into it, to serve as an electrode. When a discharge of electricity is caused to take place in these tubes, by connecting the electrodes to the terminals of a Ruhmkorff's coil or a Holtz's machine, very brilliant effects may be produced. See CROOKES TUBES.

**Gelatin**, *jel'a tin*, an animal substance closely resembling glue. It is confined to the solid parts of the body, such as tendons, ligaments, cartilages and bones, and exists nearly pure in the skin, but it is not contained in any healthy animal fluid. Its leading character is

the formation of a jelly when its solution in boiling water cools. Gelatin does not exist as such in the animal tissues, but is formed by the action of boiling water. The coarser forms of gelatin, from hoofs and hides, are called *glue*; that from skin and finer membranes is called *size*, and the purest gelatin, from the air bladders and other membranes of fish, is called *isinglass*. Gelatin is a nutritious article of food, and as part of the diet in hospitals it produces the best effects; but animals fed exclusively on it die with the symptoms of starvation, as it cannot yield albumen, fibrin or casein. The combination of tannin with the gelatin in hides changes them to leather, and it is upon this principle that the art of tanning depends. See GLUE; TANNING.

**Gelée**, *zhe la'*, CLAUDE (1600-1682), a French landscape painter and etcher, generally known as Claude Lorrain. After studying in Naples and Rome, he traveled through Germany and France, then returned to Italy and settled in Rome, where he enjoyed the patronage of the popes Urban VIII and Clement IX. Among his famous paintings are the *Embarcation of Saint Ursula*, in the National Gallery, London; the *Finding of Moses*, in the Madrid Gallery; the *Expulsion of Hagar*, at Munich, and the *Village Dance* and the *Landing of Cleopatra at Tarsus*, in the Louvre, Paris. His pictures are noted for the brilliant effects of light reflected in the sky, clouds and water and for the poetic feeling shown in the interpretation of nature.

**Gelsemium**, *jel se' mi um*, or **Yellow Jasmine**, a shrub of the Southern states, with opposite, lance-shaped, shining leaves and sweet-scented yellow flowers. The root is poisonous, but has valuable medicinal properties, being used for controlling certain forms of nervous irritability.

**Gemini**, *jem'i ni*, (the twins), a constellation, so named from its two bright stars, Castor and Pollux. Gemini is the third sign of the zodiac. The sun is in the constellation of Gemini from the twenty-first of May to about the twenty-first of June. The symbol of Gemini is  $\Pi$ .

**Gems**, *jemz*. See PRECIOUS STONES.

**Gems**, ARTIFICIAL. The great value of gems led to their imitation in the earliest times. The Egyptians, who understood the art of coloring glass, made excellent imitations of the most costly precious stones known to them. The Romans used powdered rock crystal in imitating gems, and their counterfeits were so successfully made that it was difficult to distinguish them

from the genuine article. The alchemists of the Middle Ages also produced excellent imitations of the emerald, ruby, sapphire and topaz.

Modern imitations are of glass, usually known as *paste* or *strass*. This glass contains a large proportion of oxide of lead in its composition, and this makes it remarkably clear and brilliant. It is colored to imitate the most highly-prized precious stones, by the same process that is used in making colored glass (See GLASS, sub-head *Colored Glass*). When clear, paste resembles the diamond, but it is soft and can be easily scratched, so that by testing it with a quartz crystal or piece of hard steel, it is easily detected. Imitations are also produced by using cheaper stones, having close resemblance to the genuine. Clear quartz and white Brazilian topaz, as well as colorless varieties of the sapphire and emerald, are often sold for diamonds. Cheap stones are also colored to resemble carnelians and agates. All of these imitations are skillfully prepared, and one not conversant with the methods of testing gems is liable to be deceived if he makes purchases of unreliable dealers.

Diamonds and rubies have been successfully made by chemical process. The product was genuine, but the stones were all very small and the experiments were attended with so great expense as to make their production impracticable for commercial purposes.

**Gendarmes**, *zhahN dahrm'*, the name originally given in France to the whole body of armed men, but after the introduction of standing armies to a body of heavy-armed cavalry, which composed the chief strength of the forces. Gendarmes are now the French armed police. There are *horse gendarmes* and *foot gendarmes*.

**Gen'eraliza'tion**, the act of inferring the characteristics of a class of things from observation of the qualities of one or more members of the class. For example, we generalize when, having noted the same characteristics in the cat, the tiger and the lion, we assert that these characteristics are peculiar to the genus to which the three animals belong. The term *generalization* is applied not only to the act but to the product of inductive reasoning. Corresponding to this process of thought, which more fully determines class attributes, is an extension of the meaning and application of the term that names the class. See APPERCEPTION; CONCEPT.

**Genesee**, *jen e see'*, **River**, a river which rises in Potter co., Pa., flows north through New York and falls into Lake Ontario, 6 mi. below Rochester, after a course of 145 miles



## Genesis

It is notable for its varied and romantic scenery and its extraordinary falls. These falls are five in number; three of them occur about 90 miles from the mouth of the river and are respectively 30, 90 and 110 feet high. The other two are near Rochester and are both about 100 feet high.

**Genesis**, *jen'e sis*, (creation, birth, origin), the first book of the Bible and of the Pentateuch. It received this name from the Greek translators. *Genesis* consists of two great but closely connected divisions: 1, The history of the creation, the fall of man, the flood, the dispersion of the human race; 2, the history of the fathers of the Jewish race.

**Genet**, *zha na'*, EDMON CHARLES EDOUARD (1765-1834), a French diplomat, born at Versailles. He served in minor diplomatic posts until 1781, when he succeeded his father as chief of the bureau of correspondence in the department of foreign affairs. During the Revolution, Genet was in sympathy with the Girondists and became ambassador to Holland in 1792, but in the following year he was made minister plenipotentiary to the Congress of the United States. Landing at Charleston, S. C., in April, he was enthusiastically received as a representative of a people striving for liberty, and his open efforts to secure recruits for the conquest of Louisiana were successful. However, he also began to give commissions to privateers, thus clearly leading the United States to violate its neutrality between France and England. Consequently, President Washington and Secretary of State Jefferson notified him that his activity must cease. He disregarded this warning, however, until his recall was demanded of the French government. This occurred in 1794, but Genet did not return to France. He became a naturalized citizen and settled in New York, where he married a daughter of Governor George Clinton.

**Gene'va**, *je ne'va*, a town of Switzerland, capital of the canton of the same name, at the western extremity of Lake Geneva, where the Rhone issues and divides the town into two portions, the larger and more important of which is on the left, or south, bank. It was formerly surrounded by walls and regular fortifications, but since 1850 these have been removed. The town is divided into two parts, an upper and a lower. The upper town consists of well-built houses and handsome hotels; the lower town is the seat of trade and the residence of the poorer classes. The most important buildings are the cathedral, or Church of Saint Peter

## Geneva Convention

(built in the eleventh century); the townhouse; the Musée Fal; and Musée Rath and the university building. The only important manufactures of Geneva are those of watches, musical boxes and jewelry, of all of which it produces about \$10,000,000 annually. Geneva has ample railway communication and is one of the principal entrances for tourists and travelers into Switzerland. In literature and science it has long occupied a distinguished place, and it has been the birthplace or the residence of many eminent men, including Calvin, Knox, Le Sage, Necker, Rousseau and Sismondi. Population in 1910, including suburbs, 125,520.

The canton of Geneva has an area of 109 square miles, and is in the basin of the Rhone. The only streams of importance are that river and the Arve. Abundant crops of all kinds suitable to the climate are raised, and the whole territory has the appearance of a garden. Its constitution is the most democratic in the federation. It embodies the referendum and provides for compulsory arbitration of labor disputes by especially organized courts. Population in 1910, 154,159.

**Geneva**, N. Y., a city in Ontario co., 52 mi. s. e. of Rochester, on Seneca Lake, on the Seneca & Cayuga Canal and on the New York Central, the Lehigh Valley and other railroads. It has a beautiful location above the lake and is the seat of Hobart College and of the state agricultural experiment station. There are manufactures of stoves, boilers, optical supplies, cereals, and other articles, besides very extensive nurseries. It was chartered as a city in 1898. Population in 1910, 12,446.

**Geneva**, LAKE, or **Lake Lemán**, the largest of the Swiss lakes. It has the form of a crescent and is traversed by the river Rhone. Its length is 45 miles, its greatest width 8 miles and it is 1150 feet above the sea. Its waters are of a beautiful blue color, the scenery on its shores is remarkably beautiful and the region is visited yearly by thousands of tourists.

**Geneva Arbitra'tion**, the arbitration of a controversy between the United States and Great Britain, growing out of the activity of the privateer *Alabama* against the American commerce during the Civil War (See ALABAMA CLAIMS). The tribunal was provided for by the Treaty of Washington in February, 1871.

**Geneva Convention**, the name given to an agreement made between various European powers which met in 1864 at Geneva. It provided for the care of the sick and wounded in

## Genghis Khan

time of war, regardless of nationality, and specified that hospitals and ambulances should be regarded as neutral so long as they had sick or wounded in them; it declared that all persons engaged in caring for the sick and wounded should be regarded as neutral; that any family which received and cared for sick soldiers should be by that fact absolved from the necessity of quartering troops; that wounded men should be allowed, when cured, to return to their own country on condition of not bearing arms during the remainder of the war, and that a badge consisting of a red cross on a white ground should be the distinguishing mark of all ambulances and hospitals, as well as of the staffs. This convention has now been agreed to by all the European powers, as well as by Persia. See RED CROSS SOCIETIES.

**Genghis Khan** or **Jenghis Khan**, *jen'gis kahn'*, (1162-1227), the first great Mongol conqueror. He succeeded his father when only fourteen years of age and made himself master of the neighboring Mongol tribes. After much terrible warfare with various Tartar tribes, he was proclaimed khan of the united Mongol and Tartar tribes. The conquest of China occupied the Mongols more than six years. The capital, then called *Yenking* (Pekin), was taken by storm in 1215 and plundered. Bokhara and Samarcand, two cities in Turkestan, were stormed, pillaged and burned. In 1225 Genghis marched in person at the head of his army against the king of Tangut (southwestern China), who had given shelter to two of his enemies and had refused to yield them up. A great battle was fought, in which the king of Tangut was totally defeated. The victor remained some time in his newly conquered provinces, while two of his sons went to complete the conquest of northern China. At the death of Genghis his immense dominions were divided among his four sons.

**Genii**, *je'ni i*, tutelary deities, the ruling and protecting powers of men, places or things. According to the belief of the Romans, which was common to almost all nations, every person had his own genius; that is, he had a spiritual being, which introduced him into life, accompanied him during the course of it and again conducted him out of the world at the close of his career.

**Gennesaret**, *jen nes'sa ret*, LAKE OF, or **Sea of Galilee**, a fresh-water lake in Central Palestine, 13 mi. long and 7 mi. broad. It is traversed by the Jordan in its upper course. On the east the coasts are nearly 2000 feet high and are

## Genoa

deeply furrowed by ravines, though they are flat along the summit. At the time of Christ there were on its shores nine flourishing cities, of which seven are now uninhabited ruins, while Magdala and Tiberias are both in a poverty-stricken condition.

**Genoa**, *jen'o ah*, a seaport of North Italy, the chief commercial city of the kingdom, on the coast of the Mediterranean. It is beautifully situated at the foot and on the slope of the Ligurian Alps. It is enclosed by extensive fortifications, and the heights around are crowned with detached forts. In the older parts of the town the streets are extremely narrow and have lofty buildings. In the newer quarters many avenues are spacious and are lined with palaces and other noble edifices. The finest streets are the Via Balbi, Via Garibaldi, Via Roma and the avenue Via di Circonvallazione. The principal buildings are the ducal palace, the townhall, the Palazzo Reale and the palaces of Doria, Serra, Cambasio, Balbi and Durazzo. The most remarkable of the churches are the Duomo, or Cathedral of San Lorenzo; Santa Maria in Carignano; Santo Stefano; Santo Ambrogio, and the Annunziata. The principal charitable institution is the Albergo de Poveri, and others are the Ospedale del Pammatone and a hospital recently built by the Galliera family. Among the theaters of the city may be mentioned the Teatro Carlo Felice. Besides the university the chief educational institutions are the theological seminary, the school of fine arts, the royal marine school and the navigation school. The manufactures of Genoa include cotton and silk goods, velvets, gold, silver, paper and leather goods, sugar and preserved fruits.

Under the Romans Genoa was famous as a seaport. After the breaking up of the empire of Charlemagne, it constituted itself a republic, presided over by doges. From 1119 it was almost constantly at war with Pisa down to 1284, when Genoa inflicted a crushing defeat on Pisa. The rivalry between Genoa and Venice was a fruitful source of wars during the twelfth and fourteenth centuries. Meanwhile, the city was internally convulsed by civil discord and party strife. In the absence of internal tranquillity, the city sometimes submitted to a foreign yoke in order to get rid of anarchy. In 1528 the disturbed State regained tranquillity and order, which lasted till the end of the eighteenth century. The form of government established was a strict aristocracy. Little by little Genoa lost all her foreign possessions. Corsica, the last of



all, revolted in 1730 and was ceded in 1768 to France. In 1797 a democratic constitution was adopted, and the Ligurian Republic was formed. After the Battle of Marengo (1800) Genoa was taken possession of by the French. In 1805 it was formally annexed to the empire of France and ten years later, to the kingdom of Sardinia, with which it has become a portion of the kingdom of Italy. Population in 1911, 272,077.

**Genseric**, *jen'sur ik*, a king of the Vandals, who, having obtained joint possession of the throne of Spain, with his brother Gonderic, crossed the Straits of Gibraltar with 50,000 men in 429, on the invitation of Bonifacius, the Roman governor of Africa, to assist him against the Moors. He, however, soon declared his independence, and, having completely defeated Bonifacius, founded a kingdom, which, in 439, had its seat at Carthage. See VANDALS.

**Gentian**, *jen'shan*, a large genus of plants, having opposite, strongly ribbed leaves, and blue, yellow or red, often showy, flowers. The calyx consists of four or five segments, and the corolla has four or five petals. The fruit is a two-valved, one-celled, many-seeded capsule. Gentians are for the most part natives of hilly or mountainous districts in the northern hemisphere. The root has a yellowish-brown color and a very bitter taste, and it is imported in considerable quantities into the United States, where it is used medicinally and, also, as an ingredient of cattle foods. Several species grow in this country, among them the beautiful blue fringed gentian of the Northern states.

**Genus**, *je'nus*, in scientific classification, an assemblage of species possessing certain characters in common, by which they are distinguished from all others. It is subordinate to *order*, *tribe* and *family*. A single species, possessing certain peculiar characters which belong to no other species, may also constitute a genus, as the giraffe. In naming plants and animals, the generic name is given first, as *Felis leo*. Here the name *Felis* is the generic name and shows that the lion belongs in the cat genus. *Leo* is the specific name. In writing it, the generic name is often abbreviated as *F. leo*.

**Geoffrey**, *je'fry*, of **Mon'mouth** (about 1100—about 1154), an ecclesiastic and historian of the twelfth century. He sprang from the Norman settlers in Wales and became archdeacon of Monmouth, whence he was, in 1152, raised to the bishopric of St. Asaph. His famous history was first published in 1128. This *Chronicon sive Historia Britonum* is now known to be, as the

compiler states, chiefly a translation from an ancient book in the Breton tongue, discovered by Walter Calenius, an archdeacon of Oxford. It contains a pretended genealogy of the kings of Britain from the time of the fabulous Brutus, or Brute, the Trojan, to the death of Cadwallader, king of Wessex, in 688. It was soon translated into French, English and Welsh and became a great source of romance to the writers of successive generations.

**Geographical Societies**, associations formed with the view of obtaining and disseminating geographical knowledge. Among such societies in the United States are the American Geographical Society, which publishes a journal called the *Bulletin*; the National Geographical Society, which publishes the *National Geographic Magazine*, and the societies of Baltimore, Philadelphia and Chicago. The Royal Geographical Society in London is one of the most important organizations of this class.

**Geography** is the science that describes the earth in its present condition, including the distribution of plants and animals on its surface, and treats of it as the home of man. Geography is more or less closely related to all other branches of natural science. In determining the form, measurements and motions of the earth, it depends upon principles and laws discovered by astronomy. In describing the earth's surface and the material of which it is formed, it touches upon geology, and it draws upon botany and zoölogy in its discussion of vegetable and animal life; while in treating of man it depends for many of its facts upon ethnology, and it is also the foundation upon which history largely rests. Nevertheless, geography is not simply a collection of facts obtained from these various branches of science, but it is in itself a science, based upon principles and laws which have been discovered by comparing the results obtained from the sciences with which it is so closely related.

Geography is generally classified in four divisions, mathematical geography, physical geography, political geography and economic geography. *Mathematical geography* is that branch of geography which treats of the form, size and motions of the earth and the measurements upon its surface. It is closely related to astronomy, also to surveying (See ASTRONOMY; SURVEYING; MAP). *Physical geography* treats of the surface of the earth in its present condition and discusses the principles and laws under which these conditions have been produced, points out the natural divisions of land and

## WONDER QUESTIONS IN GEOGRAPHY

**Do people on the side of the earth opposite us walk upside down?**

Since our earth is a ball, the heads of people in Australia, for example, are pointing in exactly the opposite direction from those of people in the United States and Canada. But the Australians are in no more danger of flying off into space than the Americans are, for the law of gravitation operates universally. There are no ups and downs in the universe. No matter in what part of the earth a man may be, it always seems to him that the sky is overhead and the ground below. "Up" and "down" are terms used for convenience, but in the great scheme of the universe they have no significance except as they refer to the center of the earth.

**What would be the result if the earth did not rotate on its axis?**

Because of the earth's rotating motion some portion of our planet is being shut off from the sun's light all the time. That is, there are alternating periods of darkness and daylight for every portion of the globe. If the earth did not rotate the side facing the sun would have daylight the year round, and the other side would be in perpetual darkness.

**Why are day and night of unequal length?**

Because the earth's axis is inclined about  $23^{\circ} 0'$  from a perpendicular to the plane of its orbit. If the axis were perpendicular an imaginary line separating the illuminated side of the earth from the dark side would pass directly through the poles. Exactly half of the northern hemisphere and half of the southern would always be in the light as the earth traveled around the sun, and day and night would always be of equal length in all parts of the globe. But because the earth is tipped and rotates diagonally, the portion of the northern hemisphere receiving light is greater than the portion in darkness, when the northern hemisphere is turned toward the sun, and the dark portion is greater than the light portion when that hemisphere is turned away from the sun. The same conditions are true for the southern hemisphere. Thus the periods of daylight and darkness are subject to considerable variation.

**Why do people in the northern hemisphere have their coldest weather when the earth is nearest the sun?**

This may sound improbable, but it is true. The path in which the earth travels around the sun is not exactly circular, and the distance of our planet from the sun therefore varies. It is during the northern winter that the earth comes nearest to the sun. However, the amount of heat which any section of the globe receives depends upon the angle at which the sun's rays strike it. The fact that the sun is nearer the planet at one time than another is not a determining factor, for the variation is not great enough to modify the effect of the rays. Dur-

ing the northern winter the sun's rays fall vertically at points south of the equator, while in the northern hemisphere the rays are very oblique. Direct rays give more heat than slant rays because they pass through less air and are spread over less surface. Thus the northern hemisphere has its coldest weather after the sun has reached the southern tropic.

**Why doesn't the earth run away from its own atmosphere?**

The atmosphere is an inseparable part of the earth's system, and travels with our planet on its endless journey around the sun. Though the earth revolves at the enormous rate of 66,000 miles an hour, there will never be any danger of its running away from the air.

**How far does the atmosphere extend?**

No one knows the thickness of the earth's atmospheric envelope, but many authorities estimate it to be between one hundred and two hundred miles. Half of its bulk, however, is within two and one-half miles of the earth's surface; beyond that point it becomes increasingly rare.

**Are there mountains in the ocean?**

Yes, Cuba and other islands of the West Indies are probably the tops of an oceanic range, and many volcanic and coral islands are peaks of submarine mountains. Sometimes the crests of mountains wholly under water are discovered by sounding operations. However, no mountain ranges like those on land have as yet been discovered on the open ocean bed far from the shores of continents.

**What is known of conditions beneath the surface of the ocean?**

In the upper parts of the open ocean there are numerous forms of animal life, ranging in size from whales to organisms invisible to the naked eye. Shallow waters nearer shore teem with both animal and plant life. Here are pastures of moss and gardens of seaweed. On the ocean floor far out at sea there are vast stretches of ooze, made up of innumerable tiny shells more or less decomposed. These are the remains of minute one-celled animals that lived in past geologic ages. There are no plants on the deep ocean floors, because sunlight cannot penetrate to those depths, but various forms of animals, many of which are blind, exist there. The ocean between the upper layers and the lowest depths has been described as a cold, quiet, monotonous desert.

**Could fish that live in the deepest parts of the ocean exist near the surface, and vice versa?**

No, because the pressure at the bottom of the sea is enormously greater than that near the surface. Fish living at a depth of 32,000 feet, for example, are supporting a weight of nearly six tons upon every



square inch of their bodies, and they are especially adapted to withstand this enormous weight. If they should swim into the upper layers of water they would burst. Shallow-water fish, on the other hand, would be crushed if they swam into lower depths.

**How far is it from the top of the highest mountain to the lowest depth of the ocean?**

Mount Everest, the loftiest peak in the world, is 29,002 feet high. The lowest ocean depth, so far as is known, is 32,088 feet below sea level (near the Philippine Islands). The distance between is 61,090 feet, or nearly twelve miles.

**What is the cause of thunder and lightning?**

Lightning is an electrical disturbance. Scientists tell us there are two kinds of electricity, positive and negative; also, that positive and negative charges mutually attract each other. Now when two clouds, or a cloud and the earth, oppositely charged, get so close together that there is an electrical discharge, a shower of sparks occurs. A flash of lightning is in reality a succession of sparks a very small fraction of a second apart. A flash comparatively near one appears as a zigzag line of brilliant light, which sometimes breaks into several branches. This is often called chain lightning. So-called sheet (or heat) lightning is the illumination in the sky of chain lightning which is itself not visible to the observer. Thunder is a result of the sudden expansion and compression of the heated air along the path of the flash. There is produced a partial vacuum along this line of discharge, and the violent inrush of air into the partial vacuum causes the sound. When the observer is about the same distance from each of the two surfaces between which the discharge takes place, a sudden crash is heard; if the observer is much nearer one end of the path of discharge than the other he hears a prolonged roll, for the sound reaches the ear from different parts of the path at different times. A rumbling roar is often produced by clouds that reflect and hills that echo the sound. As sound travels more slowly than light, the interval between a flash and the accompanying roar is often quite perceptible. When the flash is very near the two may seem to be simultaneous.

**What causes the phenomenon known as the "sun drawing water"?**

This interesting spectacle occurs when the sun shines through rifts in the clouds. Minute dust particles in the air reflect and scatter some of the light, and mark the passage of the rays.

**Does it ever rain angleworms?**

No, such a phenomenon has never taken place, though people sometimes believe that there are showers of worms. Everyone has seen the walks fairly well covered with worms after a spring rain, but the shower merely caused the creatures to emerge from their underground burrows.

**How can it rain from a cloudless sky?**

In this case the precipitation is light and covers only a small area. There is some moisture in the air and there are favorable conditions for its condensation

into raindrops, but not enough drops are formed to make a visible cloud.

**Is there another side to the rainbow?**

No doubt you have often wondered if people on the other side of the rainbow can see it as well as you. When you remember that you always see the rainbow in that part of the sky which is opposite the sun, and view it always with the sun behind you, you will readily see that there is only one side to the rainbow. The rainbow is caused by reflection and refraction of the sun's rays as they fall on drops of rain; each drop acts as a tiny prism and breaks up the white light of the sun into the different colors that we see in the bow. But you can never see the arch of colors when you are facing the sun.

**What causes the cracks and chasms in a glacier?**

A glacier is a moving mass of ice, whose movements are much like those of a stream. That is, it moves faster at the surface than at the bottom, and more swiftly in the center than at the sides. Because of these differences of movement the ice mass is subjected to a strain that causes its surface to become seared with cracks and chasms, which are sometimes fifty or sixty feet deep. As the break is at right angles to the direction of the strain, the cracks frequently point upstream.

**How were the mountains formed?**

Nearly all of the mountains are gigantic wrinkles in the earth's crust. They are the result of some tremendous upheaval within the rock mass, which caused the earth's crust to fold or crumple in such a way that huge masses were uplifted. A few mountains are the result of erosion, or wearing away of land areas by wind, water, etc. Sometimes certain areas are so hard that they resist this wearing action, and when the surrounding land has been worn down they stand out alone and form mountains. Other mountains are formed by the eruption of great masses of igneous (heated) rock and other volcanic material. Sometimes there are eruptions of igneous rock that never reach the surface, but which form mountains by bulging up the crust above them.

**What causes salt lakes to form? Could a salt lake ever become fresh?**

Such lakes are salt because they have no outlets. The water that flows into a lake basin contains various mineral salts in solution. If there is an outlet, water and salt flow off together, but if there is no outlet the salt remains in the lake bed when evaporation takes place. In the course of time the water may become mere brine. Salt lakes have been known to become fresh, when, after a period of drought, the water has disappeared and left the mineral salts deposited on the lake bottom. After a time the salt deposit is covered with a layer of soil brought by the winds, and the lake basin eventually is filled with fresh water.

**What is a "lost river"?**

These interesting rivers are streams which disappear beneath the surface in parts of their courses, and continue as underground rivers. Usually the stream

gets "lost" by plunging into a sinkhole. Such rivers are common in limestone regions; one of the most notable flows along the floor of Mammoth Cave, Kentucky. Subterranean rivers in Southern California have been brought to the surface for irrigation purposes.

### Of what is fog composed?

A fog is simply a cloud near the ground, and is therefore made of moisture which has condensed and become visible. If you should ascend a mountain whose upper slopes are wrapped in clouds you would eventually find yourself enveloped in a mist, and if you went on to the top where the sun had dispelled the mist you would look down upon the rolling clouds you had first viewed from below. People who live in large cities often suffer from aching throats on a foggy day. This is because the fog collects the ill-smelling gases and smoke common to city air.

### What is a mirage?

A mirage is a deceptive appearance frequently seen in deserts and other arid regions. The conditions that prevail in a desert are especially favorable to the formation of a mirage. Here the air near the surface of the ground often becomes very hot, and there is formed a sort of bounding surface between the lower and upper layers of air. The bounding surface acts like a reflecting mirror, in which objects appear as if upside down. A bit of sky may be reflected and seem to the distant observer to be a lake in the desert. Trees are sometimes thus reflected, and travelers, thinking they are seeing the trees imaged in water, form the conclusion that they are approaching an oasis.

### What are the "northern lights"?

The scientific name for this beautiful phenomenon of northern skies is *aurora borealis*. Years ago many people believed that the display was the reflection of sunlight shining on the icebergs in far northern regions. But scientists now believe that the aurora is caused by the passage of electricity through the upper atmosphere, where the air is very rare. The display is probably a form of electric discharge, similar to that produced by a frictional electrical machine. In appearance the aurora is a great arch made up of many streamers or rays of light, varying in color between crimson and pale green or yellow. The rays are constantly in motion and assume an endless variety of shapes.

### Where do winds come from?

Wind is simply air in motion. Everyone has noticed that there is an upward current over a lamp chimney or an open fire. This is the result of heating and expansion of the air. The expanded air is less dense than the cooler air about it, and so is forced upward as the heavier, surrounding air pushes in. Something of this nature is taking place on a large scale in the atmospheric envelope of the earth. Winds are caused by changes of temperature. When, in any locality, the temperature of the air is raised to a point higher than that of the surrounding air, the heated air expands and is pushed upward by the heavier air which flows in. In the general scheme of circulation we find two great movements taking

place: the heated air at the equator is rising and flowing toward the poles, and cooler surface currents are flowing toward the equator.

Why is it generally warmer at the autumn solstice (September 23), when the sun's rays shine vertically on the equator, than at the spring solstice (March 21), when the sun is exactly in the same position?

This question applies, of course, to the north temperate zone. Although the sun has the same position in March as in September, in March the earth is still feeling the effects of three or four months of cold weather, while in September the accumulated warmth of the summer months modifies conditions. For the same reason August is a hotter month than June, though the sun reaches its farthest point north on June 22.

Where on the globe do travelers journeying eastward lose a day, and those journeying westward gain a day?

This occurs at the international date line, which is the 180th meridian. Because of the earth's curvature, sunrise, noon and sunset move continuously westward at the rate of fifteen degrees of longitude every hour. For instance, when it is 7:00 A. M. at New York City it is 4:00 A. M., or three hours earlier, at San Francisco. That is, the sun rises three hours earlier at New York than at San Francisco. The watch of a traveler going westward is therefore gaining time at the rate of one hour for about every 900 miles. One going eastward finds his watch losing at the same rate. It is apparent, then, that in a trip around the globe one would lose or gain an entire day. For convenience, the 180th meridian has been adopted as the international date line, and ships crossing this meridian drop a day from the reckoning, or add one to it, according to the direction of travel.

Why did the United States Congress pass a law in 1918 requiring clocks to be set ahead one hour on the last Sunday in March?

This law enabled people all over the country to save an hour of daylight each day. During the spring and summer months the sun is shining vertically on points between the equator and the Tropic of Cancer, and the periods of daylight are longer than in the winter months. By adjusting their clocks and regulating their getting-up hour and their going-to-bed hour according to the sun, people make use of more daylight than when they use the same time schedule throughout the year. On the last Sunday in October the clocks are set back an hour, to correspond to the later hours for sunrise.

Why do we have an added day in February every four years?

This is for the purpose of making the calendar accurate. Although we reckon the year as 365 days, the earth makes a complete revolution around the sun in 365 days plus five hours, forty-eight minutes and forty-six seconds. By adding one day to the



calendar every fourth year we make the calendar and solar years nearly agree. Years in which February 29 occurs are called leap years. There is still another correction necessary, however, as the added day is a little too much time. Ordinarily every year divisible by four is a leap year, but to make the reckoning exact it was decided to call century years leap year only when divisible by 400. The year 1900 was therefore not a leap year, but the year 2000 will be.

### How can scientists foretell storms and other weather conditions?

Weather forecasting is done by scientific methods. The procedure of the United States Weather Bureau is typical. There are scattered throughout the country more than 200 observation stations. Every twelve hours the head of each station makes observations of the sky and clouds, reads the barometer to ascertain the pressure of the air, observes the direction and velocity of the wind, measures the amount of rainfall or snowfall, calculates the amount of moisture in the air, and reads the thermometer. The result of his observations are then summarized, condensed into a cipher message of four or five words, and sent to the proper telegraphic circuit. The messages are all finally collected at the central office in Washington, and are also translated at various forecasting stations along the route. Twice a day the Washington office constructs a weather map showing conditions over the country, and by means of such maps forecasters predict conditions for their own localities and neighboring territory.

### Why is snow white?

According to the accepted theory of color, white is a mixture of all the colors of the rainbow. Any object looks white which reflects all colors equally; an object looks red which reflects only the light wave that produces red and absorbs all the others. When vapor is condensed into snow crystals, the flakes have numerous tiny surfaces, each of which acts as a reflector and sends back to the retina of the eye practically all of the sunlight which strikes it. And because these tiny facets reflect all colors and absorb none, the snowflakes look white.

### Could anyone make a correct flat map of any part of the earth?

No, such a map is an impossibility, because we cannot flatten out a curved surface without distorting it. Map makers succeed in getting their maps only approximately correct. Some sacrifice form and area accuracy to get the directions correct, some get areas correct but at the same time distort forms, and so on. By one plan of map making all points in the same longitude are in the same vertical line, but a map of the western hemisphere made on this plan shows North America much larger than South America. This is due to the fact that such a method exaggerates east and west distances near the poles, and as North America is broadest near the North Pole, it is all out of proportion on the map.

### How do towns and cities get their water supplies?

In sparsely settled districts wells and springs afford sufficient water for drinking and other purposes, but large cities have quite a different problem. In many cases the city is obliged to bring the water a long distance. An aqueduct 250 miles long is to supply Los Angeles with water from the Owens River, and New York City depends upon the Croton River and the Catskill Mountains. Loch Katrine supplies Glasgow, forty-two miles away, and Lake Vyrnwy is the source of the water supply of Liverpool, which is over sixty miles distant. Lake cities, like Chicago and Cleveland, are more fortunate, but even Chicago had to construct a six-mile tunnel to obtain pure water. The matter of securing a water supply is one of the most important problems of a large municipality.

### How do volcanoes make lakes?

Sometimes a flow of lava from an active volcano forms a natural dam across a river valley and thus creates a lake. Crater Lake, in the southern part of Oregon, is a good example of a lake formed by the filling up of an old crater.

### Why does a mariner's compass point north and south?

Nearly everyone has experimented with a bar of steel or nickel that can pick up small pieces of metal. We know that substances which attract metal in this way possess the quality of magnetism. Because the earth itself acts as a gigantic magnet, a very useful device, the mariner's compass, can be used by sailors to help steer their vessels. The earth has a north and a south magnetic pole, the former lying in Boothia Peninsula, north of Hudson Bay. The latter is south of Sydney, Australia. Since like magnetic poles repel each other, and unlike ones are attracted, the magnetic needle of the compass is kept pointing in a northerly and a southerly direction by the magnetic poles of the earth. It is only in certain places, however, that the needle points directly north and south. This is due to the fact that the magnetic poles of the earth are not situated at the geographic poles. Mariners have to take into consideration the variation from the due north and south direction in calculating their position on the sea.

### Where, in the same latitude, can one find all the degrees of temperature between summer and winter?

Such a variation in climate can be found on a mountain in a tropical region. At the base of the mountain perpetual summer reigns, but as the traveler ascends the slopes he finds the temperature gradually decreasing. Thus he will pass from tropical to temperate conditions and finally reach a region of perpetual snow. The vegetation and animal life of a mountain will show similar variations.

## Geography

water, shows the relation of climate to life and the relation of the earth to man. In the United States the term physiography is now very generally used to denote physical geography (See PHYSIOGRAPHY). *Political geography* treats of the earth in its relation to man, discusses the political divisions, their boundaries, the various forms of government, religion and other institutions which man has established. It is very closely related to, and by some geographies is made to include, the fourth division, economic geography. *Economic geography* treats of the industries upon the earth in their relation to the geographical conditions and also to one another. In its broadest sense it includes all of human activity, but in ordinary discussion it is usually restricted to commerce, manufactures, agriculture and mining, and under this restriction it is known as commercial geography.

**HISTORY.** The ancients' ideas of the earth were very vague. By them it was generally considered flat or in the form of a shield surrounded by water and covered by the canopy of the sky. The Phoenicians were the first to extend geographical knowledge. It is supposed that they explored the coasts of the Mediterranean, and some believe that they made voyages as far south as the southern part of Africa. The Romans' idea of geography was confined to the Roman world, including the southern part of Europe, northern Africa and western Asia, and these boundaries of geographical knowledge were not materially extended until the Middle Ages. In the thirteenth and fourteenth centuries reports from travelers who had been as far as China and Japan gave the people of Europe some knowledge of that part of the world and prepared the way for the great era of exploration which began in the latter part of the fifteenth century. During this period new ideas concerning the form of the earth were advanced, the southern point of Africa was reached and a water route to India was found. The New World was also discovered. These discoveries led to unusual activity during the sixteenth century. The coasts of the New World, with the exception of those bordering upon the Arctic Ocean, were explored, and the earth was circumnavigated. Following this period of discovery, attention seems to have been given to conquest, and during the seventeenth and eighteenth centuries voyages of discovery were not so numerous. The nineteenth century is noted for the many expeditions into the interior of unknown continents and to the polar regions. By the close of that century Africa, Australia

## Geography

and all other remote lands had been explored, and the only large portions of the earth which had not been visited were those immediately surrounding the poles.

But the greatest advance in geography made during this period was in the organization of its facts in accordance with the principles and laws which governed them and the placing of geography on a true scientific basis. With the accomplishment of this work, views concerning the scope, purpose and value of geography greatly changed. Instead of being considered a knowledge of unrelated facts, it came to be known as a science, depending upon fundamental principles and laws, which were of more importance to the geographer than the mere facts concerning the size, form, inhabitants and other conditions of the earth's surface. The outgrowth of these ideas has led to the establishment of what is known as the *new geography*, which means geography as studied from a scientific point of view. See CLIMATE; EARTH; LATITUDE; LONGITUDE; WEATHER BUREAU; also GEOGRAPHY, in Vol. V.

**Geography, METHODS OF TEACHING.** The purposes of geographical study should be:

(1) To give the pupil a knowledge of the most common facts of geography which are found in his immediate surroundings, such as the plants and animals living in his locality and the occupations with which he meets from day to day.

(2) To lead him to become familiar with the fundamental principles and laws of geography, such as those governing climate and the distribution of life.

(3) To lead him to apply these laws and principles in determining geographical conditions.

(4) To lead him to see how these conditions control human activities at the present and how they have affected these activities in the past.

**TEACHER'S PREPARATION.** In order to accomplish these ends, the teacher must be thoroughly prepared for her work. This preparation should include (a) a knowledge of the fundamental principles and laws of the science and ability to apply them to the conditions of her environment; (b) a knowledge of the great facts of geography, such as the climatic conditions of the different parts of the various continents, the effect of mountains upon climate and the characteristic animal and vegetable life of the different regions of the earth; (c) a knowledge of the more minute facts of her own country, state and town; (d) a knowledge of the princi-



ples of teaching (See METHODS OF TEACHING).

This preparation can be obtained by the study of standard works on geography, the elementary works on the different branches of natural science, particularly physics, botany and zoölogy; the reading of books of travel and articles of a geographical nature which are found in newspapers and other periodicals. In addition to this the teacher should be a good observer, as by careful observation she will be able to verify in her own experience many of the facts gleaned in her reading.

The teacher should be provided with such material as will assist her in the presentation of the subject in such a manner as to make it both interesting and of practical value to her class. To this end she should make collections of pictures, catalogues and circulars of the great railway and steamship lines of the country. She should also collect and arrange a scrap-cabinet, consisting of articles cut from newspapers and magazines and of references to articles in periodicals and books from which articles cannot be clipped. All this matter should be systematically arranged and catalogued. The most convenient and inexpensive plan is to place the pictures and clippings in large envelopes, either arranged alphabetically or by continent and country. For united study the latter plan is preferable, since according to such a plan all articles pertaining to the United States would be placed in the envelope headed *United States*, or if a special study were made of her own state the articles pertaining to that would be in an envelope by themselves. Pictures can be arranged in a similar manner.

PRIMARY GRADES. The work in geography in the first three grades is preparatory to a systematic study of the subject in the grades which follow. In the first and second grades only the simplest geographical facts should be treated. The beginning of this work is in connection with nature study, the geographical element here consisting of calling attention to the localities in which the plants and animals studied are found (See NATURE STUDY). In connection with this the study of the weather is helpful and interesting. A good plan for this work is to construct a calendar upon the black-board or upon a large sheet of manila paper. The calendar should be ornamented with a picture which expresses the prevailing weather of the month. If it is December and the locality is in a cool climate, this picture should show the

ground covered with snow and, possibly, children engaged in winter sports. If there is room to make the calendar sufficiently large, it adds interest to this work to characterize the weather of each day by an outline picture, in which some leading event of the day will be brought out.

From the study of plants and animals, the class naturally passes to the study of the most common substances used for food, for clothing and, with the older classes, for building purposes.

The work of the second year should be a continuation of that of the first year; but as this work is expanded the geographical feature should be more strongly emphasized, and the pupils should be led to discover many geographical facts for themselves. This should be done largely by out-of-door excursions, by which pupils may come into personal contact with nature and its phenomena. The work in geography for the third year should be largely home geography. The pupils should study the various occupations in the town or near-by city and should be led to see the reason for each of these and something of their relation to one another. This naturally leads to the study of transportation, and the reasons for carrying commodities from one place to another should be discovered. Map making should begin this year and should be of the simplest sort, consisting first of a map of the schoolroom, then of the school building and grounds. This line of work should be carefully planned and supervised by the teacher. The idea of scale should be thoroughly fixed in the minds of the pupils, and they should be led to see what a map is and what it represents. The ideas gained from travel can also be profitably introduced in this grade. Some pupils may have taken journeys to neighboring towns and cities and can relate something of what they saw. Imaginary journeys can also be taken, and suitable books of travel can be read by the pupils themselves or by the teacher, at stated times during the day.

In developing the work of the second and third grades, special attention should be given to teaching the pupil fundamental geographical concepts, with their appropriate terms, such as bodies of water extending into the land (bays and gulfs), small bodies of water surrounded by land (pools and lakes), abrupt elevations of land (hills and mountains). This line of work should be extended to cover the fundamental facts of geography, giving the pupil the necessary vocabulary for expressing himself in proper

## Geography

terms when he takes up the formal study of the text-book.

In connection with this, pupils should be taught to read maps properly; that is, to place behind the map symbols the proper mental picture, so that an irregular line (river) shall not represent a mere mark upon paper, but flowing water, containing its appropriate aquatic life, bearing on its bosom the country's commerce and giving to the country through which it flows luxuriant verdure and productive soil.

**INTERMEDIATE AND GRAMMAR GRADES.** Fourth grade classes usually begin the study of geography by the use of the text-book, and perhaps more failures in teaching this subject occur at this point than at any other. The reasons for these failures are that the pupils are not suitably prepared for the text-book and that the teacher does not become sufficiently familiar with the scope and plan of the work to introduce the pupils to it in such a way as to enable them to overcome the difficulties attending its use. The first requisite to the successful teaching of the text of a primary geography is a thorough understanding of the book on the part of the teacher; the second is a discovery of the geographical knowledge which the pupils possess. With these facts in mind the skillful teacher can so adjust the class to the book as to remove the difficulties usually met at this stage of the study.

Map making should be carried on during this year and should be extended to include sketches of the natural divisions studied and, in the latter part of the year, of the countries. Maps drawn by the pupils should be as simple as possible and should never include more than the most important features. In the main, they should be sketched and the work should be rapidly done, but accuracy of form and proportions should be insisted upon.

The work in the grammar grades is simply a continuation of that begun in the fourth grade. The difficulties to be watched and overcome are those which occur in the transition from the primary to the advanced text-book. Many texts in geography used in the grammar grades begin with a discussion of the fundamental principles of mathematical geography. Such a discussion requires altogether too broad a generalization for pupils of this age and leads to confusion and discouragement and often to a thorough distaste for the subject. Books so arranged should not be strictly followed in plan. If this part of the work is to be taken at all, it should be consid-

## Geological Survey

ered after the other portions of the book have been completed and the pupils have reached a more mature stage.

**STUDY OF TYPES.** One of the most successful plans of teaching geography is by leading the pupils to study types. There are so many facts in geography that only a few can be studied at best, and when some great topic is taken and understood, it becomes an illustration for all other objects of a similar nature, as a study of the Mississippi River leads the pupils to gain a general idea of all rivers. This is true of the study of all the great forms of land and water and of the leading industries. This method of presentation is successful, provided the teacher thoroughly prepares for the work and confines it to the capacity of the pupils. The danger is that too much will be attempted and that the type study will not be logically connected. With care to avoid these dangers, the study of types is one of the most valuable features connected with geography work. The teacher will find valuable assistance in the following works: McMurry's *Special Method in Geography*; Redway's *New Basis of Geography*, and King's *Methods and Aids in Geography*.

**Geological Survey of the United States**, a bureau in the department of the interior which has charge of the mineral resources, the geological structure and the irrigation of lands under government control. It was formed in 1879 by the combination of four independent surveys, which for a number of years had been engaged in explorations of the western part of the United States. The bureau is in charge of a director, who is required to submit an annual report of the work done by the survey to the secretary of the interior. These reports are works of great value. The most important duties with which the survey is charged are the preparation of a topographical map of the United States, the examination of mineral deposits, the collection of mineral statistics, the study of the water supply of the country, with reference to the development of water power and irrigation of arid lands, and the classification of public lands. The topographical map when completed will show the distribution of the rock formations of the country, their structure and the location of mineral deposits. As fast as completed, this map is issued in sections in folio form. For the purpose of carrying on its different lines of work, the survey is divided into several sections, among which are those of mining and mineral



resources, metalliferous ores, non-metalliferous products and physical and chemical research. In addition to its annual reports, the bureau publishes numerous pamphlets, monograms and maps.

**Geology**, *je ol' o j y*, the science which treats of the history of the earth, as learned by the study of its exterior or crust. There are a number of theories concerning the origin and formation of the earth. The one most widely known considers our planet to have been formed by the cooling and condensation of a large mass of gaseous matter, which was thrown off from the sun (See NEBULAR HYPOTHESIS). All theories consider that the earth was in the early stages of its formation at a much higher temperature than it is at the present time. Until very recently, geologists supposed the interior of the earth to be in a molten condition, and this idea gave rise to the term *crust*, which in geology is applied to the earth's exterior. The idea now held by most geologists, however, is, that while the interior of the earth is very hot, it is not necessarily in a fluid condition, because the great pressure upon the interior would so raise the melting point of the rock as to prevent its becoming liquid. The evidences of heated interior are seen in volcanoes and hot springs and in the increase of temperature as excavations are made downward from the surface. The farther the excavations extend, the warmer the crust becomes, until at great depths the temperature is so high that it is almost impossible for men to work unless the mine is cooled by air.

**FORMATION OF ROCKS.** Whatever theory one may hold concerning the origin of the earth, there is every evidence that the rocks upon its surface have been formed in two ways—by the action of heat and by the action of water. Those formed by heat are known as *igneous rocks*, and they constitute the oldest and by far the largest part of the earth's crust. These rocks first existed in a molten condition and were solidified by cooling. Granite, gneiss and basalt are good illustrations of rocks of this class (See IGNEOUS ROCKS). As the earth's crust cooled, it contracted, and the contraction produced folds, causing some portions of the surface to rise and others to sink. This was the origin of the hills and of mountains and valleys. During the formation of the earth, this process of heating and cooling, rising and falling, was repeated many times, so that the continents as they now exist went through many changes. A good illustration of this is found in the North American

continent. The first land to appear above the ocean was a V-shaped outline extending upon each side of Hudson Bay, the eastern arm of the V forming what is now known as the Laurentian Mountains, while the western arm extended in a northwest direction and constituted a height of land which divided the waters within the V from those to the west of it.

Because of these repeated contractions, the earth's crust was more or less disturbed, and while the first igneous rocks may have been formed in horizontal layers, the repeated foldings caused them to be tilted upon edge and to be thrown up so that now in mountainous regions some of the oldest rocks are found near the summits of the high mountains and many of them *outcrop*, that is, come to the surface beyond the formations of a much later date. Because at first the crust was thin, these upheavals were less abrupt than those of later date; hence, the later mountains, such as the Rocky Mountains in North America, are very high, with irregular and often jagged summits, which were caused by the breaking of the strata at the time of the upheaval.

The rocks formed by water, generally known as *stratified rocks*, are found in the lowlands along the shores of bodies of water and on the margins of streams. The lowlands near the mouths of great rivers were also formed in this way. The rain falling upon the sides of the mountains washed loose particles of rock down to the lower levels, and they were carried along by streams, until the force of the current became so slight that the water would no longer hold them in suspension. These particles then settled at the bottom of the stream, forming mud. In the course of time the land was raised, and this mud hardened into rock. In many places the flooding of the earth's crust caused the stratified rocks to be folded and tilted, so that they do not now occupy a horizontal position as they did when formed. For this reason, also, we find the igneous and stratified rocks intermingled in a confusing manner in many localities. The heat and pressure to which some of these formations were subjected have entirely changed their nature. See METAMORPHISM.

**GEOLOGIC SYSTEMS.** The history of the rocks is determined almost entirely by studying the fossils which they contain, since these show the life that existed at the time of their formation. The igneous rocks first formed contain no evidences of life, and from this it is inferred that during the earliest periods the conditions of the

## WONDER QUESTIONS IN GEOLOGY

### How old is the earth?

The age of the earth cannot be given with any degree of exactness, but all geologists agree that it must be reckoned in millions of years, and is probably not less than 100,000,000 years. The earth's story is read chiefly through the study of rocks, and the oldest rocks are known certainly to have been deposited millions of years ago.

### What do fossils tell us about the development of plant and animal life?

Fossils are the remains of plants and animals that have turned to stone. They are found embedded in rocks, and they supply some of the best arguments for the theory of evolution. The simplest fossils are found in rocks deposited when the earth was very young, and they show that both plants and animals began as rudimentary organisms. As we read the successive layers of rocks we find the fossils of higher organisms appearing in regular order, until the most completely developed forms appear. We know also from the study of fossils that many forms of life reached a high stage of development, degenerated, and then became extinct. In past geologic ages both plants and animals flourished that would seem of incredible size if they should reappear today.

### Does coal belong to the mineral or to the vegetable kingdom?

Coal is a mineral, but it is formed through the agency of plant life. Ages before man lived on earth portions of it were covered with dense growths of vegetation. In the course of time these vast forests became covered with water, and for long years they lay buried beneath the ocean's mud. Then the land rose again, and the mud hardened into rock. Upon the surface of this rock soil accumulated, and another growth of vegetation flourished in this soil. The second growth in time sank below the water and was covered, and the heat and pressure attending these changes converted the vegetation into coal. As this process was repeated many times, different veins of this fuel, separated by layers of rock, were formed. Anthracite, or hard coal, probably represents the oldest of such formations.

### If all the continents could be leveled off and the material dumped into the seas, would we have a perfectly smooth globe and the present sea level?

Because the ocean basins exceed the continental areas in extent, and the average depth of the sea is much greater than the average height of land, there is not enough land material to fill those basins. Therefore if the continents were cut down and everything brought to a common level, this level would be about 9,000 feet below the present level of the sea.

### Could the North American continent be worn down to sea level?

At all times there are forces in operation tending to wear away the land. These forces are chiefly the rivers, the atmosphere and winds. As a matter of fact, North America is being worn down at the rate of one foot in 9,000 years, and if there were no opposing forces, and this rate continued, the continent would be leveled in about 18,000,000 years. On the other hand, the present rate could not be maintained, for after a long time the forces that tend to level down would become weaker. Streams, for example, would become sluggish and would work less rapidly. There is always a possibility, too, that portions of the continent will be subject to uplift. Thus, though the continent is being worn away, the process will continue indefinitely.

### Does the ocean contain volcanoes?

Yes, volcanic action occurs in the sea as well as on land, but we never see volcanic eruptions that take place far below the surface. At the places where such eruptions occur great mounds that may become mountains are built up, and sometimes the tops of these mountains project about sea level and form islands. Much of the sediment found on the sea floor has been furnished by volcanoes.

### Is the landscape of the ocean floor as attractive as that of the continents?

There is no comparison between them, for by contrast with the diversified contour of the land the scenery of the ocean is overwhelmingly monotonous. There are, to be sure, elevations and depressions on the ocean bed, but a large part of the sea floor is nearly flat. The reason for this is that the most prominent forces acting on the ocean floor are those which tend to fill up the depressions and thus level off the irregularities. On land, however, forces of erosion tend to make the landscape very diversified.

### How do sand dunes move from one place to another?

Sand is easily picked up and carried by the wind, and it sometimes happens that a dune actually moves from one place to another by the removal of sand particles from its windward to its leeward side. Such a dune may be made up to a large extent of the same sand throughout its travels. Dunes sometimes travel into forest areas and bury and kill trees. There are orchards on the New Jersey coast which have been almost completely buried within the lifetime of their possessors. Sometimes dunes that have submerged trees and other objects move on again and restore to view the buried features of the landscape. As vegetation tends to hold sand down, a wandering dune can be checked by letting plants get a hold in the sand.



## What were some of the effects of the great ice sheets that once covered part of the earth?

It is probable that these ice sheets, several million square miles in extent, destroyed a great deal of life, and that life is less abundant today as a result. The movement of the ice also caused life to migrate. That is, as each great sheet moved forward the plant and animal life in front of its advance had to move on or perish. When the ice retreated these plants and animals found their way back again. The presence of Arctic animals in some of the higher parts of the Appalachian Mountains is an interesting survival of the period when life had to adjust itself to abnormal conditions. The great ice sheets changed the contour of the land considerably. Hills were leveled, lake beds were filled up and scooped out, and masses of rock and gravel were carried along and deposited as drift.

## Are lakes permanent bodies of water?

The tendency for all lakes is to disappear in the course of ages, but the process is, of course, slow. The waves beat on the shores, wear off sand, gravel, etc., and deposit this material into the lake bed. Rivers flowing into lakes bear great quantities of sediment and deposit it. Sand and dust are blown into the water continually. The various animals that live in lake waters contribute their portion of deposit through their bones and shells. Dead plant life adds to the accumulation. Lakes with outlets have their level constantly reduced by the unceasing outflow. All of these factors outweigh those tending to keep the water undiminished, and so it can truthfully be said that the life of every lake is doomed. In fact, there are today basins of numerous extinct lakes, and there are many other lakes in their last stages.

## Is there ground for believing that the earth will some day be a dead planet like the moon?

This prophecy used to be heard frequently when scientists believed that the earth had a molten interior and was slowly cooling off. A brighter view is taken by most modern geologists. The newest theory of the origin of the earth is that it developed from a gaseous nucleus which gradually solidified by capturing small solid bodies called planetesimals. The central mass grew slowly to the present size of the earth by the capture of other planetesimals, and so the earth was never, as used to be supposed, a hot, glowing body. The heat of the interior, according to geologists who advance this theory, developed largely through pressure. The tendency is to predict a long period of human activity and a much higher evolution spiritually and intellectually.

## How were the oceans formed?

If the earth grew by the accumulation of planetesimals, its surface was probably never smooth, but had many depressions. In the course of time the

atmosphere of the young earth began to hold water vapor, among other gases, and ultimately the vapor condensed and formed water. This water, accumulating on the surface of the earth, filled its depressions, and so made the beginning of the oceans. We must remember that this is but a theory. No one can say positively how the oceans came to be.

## In what sense is man a geologic agent?

With the advance of civilization man has greatly modified the earth's surface. A savage race could live for centuries in a land and its chief features would be undisturbed. But civilized man removes forests, levels down hills, makes artificial lakes, turns rivers from their courses, fills in portions of lake shores, and otherwise changes the landscape to suit his own purposes. In fact, mankind has come to be one of the most important agents of geological activity.

## Why do governments organize geologic surveys?

The products of geology are some of the world's most valuable economic products. For example, building stones, coal, natural gas, petroleum, precious metals, salt, fertilizers and many other products come within the field of the geologist. It is therefore a matter of great importance for a nation to survey and classify its geological resources. These resources are vital to a country's prosperity and economic development.

## Could the earth have been formed within a period of a few thousand years?

No. The fact that all of the great changes that have taken place in the past and present eras have covered long periods of time proves the great age of the earth. Geologists of a previous generation who believed in the theory of a young earth could account for the mountains and oceans only on the basis of stupendous catastrophes. They believed that the mountains were the result of violent and sudden elevations of the earth's crust, and that the seas were made by violent inroads of the water upon the land. No geologist of today accepts any such theory of violent and destructive forces.

## What is the result of an earthquake below the surface of the sea?

A subterranean earthquake is usually accompanied by the rise of a huge wave. Though the name is misleading, such a flow of water is known as a tidal wave. In many instances tidal waves have caused terrible disasters on the shores over which they have risen. In 1755 the city of Lisbon, Portugal, was overwhelmed by such a wave and in ten minutes almost completely destroyed. About 40,000 persons lost their lives in this disaster. When the submarine earthquake is severe and the sea floor is violently jarred, life in the ocean suffers much destruction, and a region of frequent shocks may be wholly lacking in marine life.

## Geology

earth were such that life could not exist. The oldest rocks contain the simplest fossils, and traces of plant life are found before those of animal life. Beginning, then, with the simplest fossils found in the oldest strata, the geologist traces the development of both vegetable and animal life from the remotest period of their existence to the present time, each period in the earth's history being characterized by the unusual development of some form of life (See FOSSIL). Because of this and of the peculiar grouping of the rocks at the time, geological history is divided into a number of periods, each of which includes several formations, known as rock systems. The periods and systems here given are those generally accepted by the leading geologists of the United States, while the geologists of England and other European countries make some minor changes in their arrangement of the systems. Each of these periods and systems is described under its proper title.

PERIODS	SYSTEMS
Cenozoic . . . . .	{ Quaternary Tertiary
Mesozoic . . . . .	{ Cretaceous Jurassic Triassic
Paleozoic . . . . .	{ Carboniferous Devonian Silurian Ordovician Cambrian
Protozoic . . . . .	Algonkian
Azoic . . . . .	Archæan

**PRESENT CHANGES.** The geological forces which have been in operation during all the ages are still at work, and changes in the earth's crust constantly occur. The most important of the forces now effecting these changes are the heat from the sun, the action of water (See EROSION), the action of the atmosphere and the disintegration of rocks by animal and vegetable life. The action of these forces tends to wear away the mountains and hills and to fill up the valleys. Lakes are becoming more shallow, and many have been changed to dry land within the memory of men now living. The land around the lower courses of rivers is continually rising, as in the case of the Mississippi, and the elevation of the continents is slowly but surely changing, as is shown by the gradual sinking of the eastern coast of North America and of the southern coast of Europe.

See PHYSICAL GEOGRAPHY; DIKE; DIP; FOSSIL; FAULT; JOINT, and the article under this heading (GEOLOGY) in the EDUCATOR, Vol. V. Consult Heilprin's *The Earth and Its Story*,

## Geometry

Shaler's *Outline of the Earth's History and Aspects of the Earth*.

**Geomet'rical Progres'sion.** See PROGRESSION.

**Geom'etry**, that branch of mathematics which treats of the properties and relations of surfaces, volumes, angles and lines. A *solid* (more correctly termed a *volume*) is a portion of space bounded on all sides and having three dimensions, length, breadth and thickness. A *surface* has only breadth and length. It may be considered as the boundary between a solid and all surrounding space or between two unbounded portions of space. A *line* may be considered either as the boundary between two portions of a surface or as an element having indefinite extension in one direction, that is, having but one dimension, length. A *point* is described as that element which has but position, lacking length, breadth and thickness. An *angle* is a portion of space lying between two lines which meet at a point, or between two or more plane surfaces meeting at a common point or line. Geometry is divided into two great classes, *elementary geometry*, which includes *plane geometry* and *solid geometry*, that is, the study of the properties of planes, lines, angles and of the simple solids; and *higher geometry*, including *analytical geometry* (See ANALYTICAL GEOMETRY), *descriptive geometry* and *projective geometry*. Descriptive and projective geometry deal with the various relations of forms of geometric bodies, according to a special method, by which figures corresponding to certain points in the body are represented on two perpendicular planes, the relations of the various points composing the body being studied by comparing these two figures.

**METHODS.** The methods of geometry differ in important respects from those used in any other branch of mathematics. Geometry reasons about absolutely abstract relations and constructs theories and systems which can have no possible concrete existence. For instance, whereas in physics two quantities can be compared only by being placed opposite to each other or by being weighed or measured by some common unit, in geometry two solid bodies are often discovered to be equal by supposing one to be superimposed upon another, that is, to be made to coincide in all its parts.

Two methods of reasoning in geometry may be distinguished, known, respectively, as *direct* and *indirect*. The former starts from certain self-evident or incontrovertible facts and proceeds step by step to a conclusion, which, provided



every step is in accord with pure reason, must be equally self-evident or incontrovertible. The indirect method begins with a supposition which may or may not be true, but which, for the sake of investigation, is assumed to be true. Upon this as a basis, a system using only known truths and demonstrated propositions is built up to a conclusion. If this conclusion accords with some known principle, the original supposition is shown to be sound. If the conclusion evidently disagrees with some known principle, the original supposition is clearly shown to be false. In the latter case the demonstration is said to be *reductio ad absurdum* (a reduction to an absurdity).

**AXIOMS.** All geometrical reasoning, whether direct or indirect, depends upon certain fundamental propositions, or axioms, among which may be mentioned the following, established by Euclid as a basis for his *Elements*: (1) Right angles are equal; (2) geometric figures can be moved in space without change of shape or size; (3) magnitudes which coincide with each other are equal; (4) the whole is greater than any of its parts; (5) two straight lines cannot enclose a space. Besides these he assumed a series of so-called postulates, or self-evident theorems, among which are (1) a straight line can be drawn between any two points; (2) a straight line can be produced to any length; (3) a circle may be described from any center to any distance from that center. These propositions and a few others which have been added from time to time by modern mathematicians are still the foundation of reasoning in geometry.

**HISTORY.** The science of geometry probably began with the Egyptians, but received its first important impetus from Greek mathematicians, among whom were Thales and Pythagoras, who studied triangles and circles, and Plato, who introduced the analytic method of investigation. Then came Euclid, known as the "father of geometry," who not only organized all the facts evolved by his predecessors, but added many new theorems. Of his followers, Archimedes and Apollonius were especially important. After the seventh century A. D. a period of stagnation in mathematical science set in, which was not ended until the sixteenth century, when the work of Vieta, Pascal and Desargues led to the application of more general methods of study and demonstration in geometry and especially to the introduction of algebraic formulas. Then followed Descartes, who extended the application of algebraic methods and laid the foundations

of modern calculus. Little further progress was made until the nineteenth century, when branches known as descriptive geometry and projective geometry were differentiated from the original subject.

**George I** (GEORGE LOUIS) (1660-1727), king of Great Britain and Ireland and elector of Hanover, was, through his mother, the great-grandson of James I of England. In 1682 he was married to Sophia Dorothea of Zell, whom, in 1694, he divorced. In 1698 he succeeded his father as elector. He commanded in the imperial army during the War of the Spanish Succession and won considerable distinction for his bravery. In 1701 he was declared heir to the British crown, and he ascended the throne on the death of Queen Anne in 1714. Among the notable events of his reign were the rising of the Scottish Jacobites (1715); the triple and quadruple alliances against Spain, and the failure of the South Sea Company (1720). George I was very unpopular with his British subjects, by reason of his lack of sympathy with England's traditions and ideals.

**George II** (GEORGE AUGUSTUS) (1683-1760), king of Great Britain and Ireland and elector of Hanover, the son of George I. He married in 1705 Wilhelmina Carolina of Anspach, who always had a good influence over him. In 1708, while electoral prince of Hanover, he distinguished himself at Oudenarde, under Marlborough. In 1727 he succeeded his father on the English throne, but inherited to the full his father's predilection for Hanover and dislike of England. The Seven Years' War, during which occurred the conquest of Canada, and the exploits of Clive in India, which furthered the growth of the British Empire there, are among the chief events of his reign.

**George III** (1738-1820), king of Great Britain and Ireland, succeeded his grandfather, George II, in 1760. In the following year he married Princess Charlotte Sophia of Mecklenburg-Strelitz. The young prince had been given an English education, and this made him from the outset of his reign more popular than his predecessors had been. The sixty years of his reign were filled with great events, among which were the Wilkes controversy; the American Revolution; the French Revolution; the Napoleonic wars, which followed, and the Irish Rebellion of 1798. In 1810 the king's mind, which had already given way several times, finally broke down, and from that time to his death his son governed as his regent.







GEORGE V

## George

**George IV** (GEORGE AUGUSTUS FREDERICK) (1762–1830), king of Great Britain and Ireland, son of George III and the princess Charlotte of Mecklenburg-Strelitz. In 1811 George became regent on account of his father's insanity, and, on the death of George III in 1820, he became king. The most important event after his attaining the throne was the passing of the Catholic Emancipation act, by the Wellington ministry in 1829. He left no descendants and was succeeded by his brother, William IV.

**George V** (GEORGE FREDERICK ERNEST ALBERT) (1865– ), king of the United Kingdom of Great Britain and Ireland and emperor of India, second son of Edward VII, was born June 3, 1865. At the age of 12 he entered the navy as a cadet, where he was subjected to the same discipline and training as his shipmates. He rose in the naval service until he reached the rank of commander, but on the death of his elder brother, the Duke of Clarence, in 1892, he retired from active service, although he retained his commission and was subsequently promoted to captain, rear-admiral, and vice-admiral. In 1893 he married Princess May of Teck, through her mother a great-granddaughter of King George III. In 1901 the prince and princess made a tour of the world, visiting the chief British colonies. When his father became king, he made the Prince of Wales his assistant in public affairs, so that he became familiar with the duties of the sovereign. On the death of Edward VII, May 6, 1910, George became king. The coronation took place on June 22, 1911. King George, unlike his father, is of a quiet, reserved nature, and little inclined to participate in social life. He is an expert in agricultural matters, and his herds of cattle are world-famous. He is also an enthusiastic collector of postage stamps, his collection being one of the most valuable in existence. He is a first cousin of Emperor William II and Czar Nicholas II.

**George I** (1845–1913), king of Greece, second son of Christian IX of Denmark. In 1863 he was elected king by the Greek National Assembly. In 1867 he married the Princess Olga, a niece of the Russian Czar. His conduct as a constitutional monarch was always wise and firm, and he won popular sympathy by his efforts to expand Greek territory.

**George, HENRY** (1839–1896), an American political economist, born in Philadelphia. He went to California when a boy, found employment as a printer and became eventually an editor. In 1879 he published *Progress and Poverty*,

## George Junior Republic

in which he promulgated the "single tax" theory (See SINGLE TAX). His works include various treatises upon the land question, the *Science of Political Economy* and *Protection or Free Trade*.

**George, ORDER OF SAINT.** The following are the principal orders which have been founded in honor of Saint George: 1, A military order instituted in Russia in 1769 by Empress Catharine II, as a reward of military achievements; no officer lower than the rank of colonel can become a member. The decoration is a white maltese cross, edged with gold, bearing an image of Saint George and the dragon and suspended from an orange and black ribbon. 2, An order instituted in Bavaria by Emperor Charles VII (Charles Albert) in 1729 and reorganized by King Louis II in 1871, with the king as grand master. Eight generations of nobility on both sides must be shown by the candidate for admission. An eight-pointed cross, showing on one side the image of the Virgin with the letters V. I. B. I. (*Virginii Immaculatae Bavaria Immaculata*) forms the decoration. The other side has an image of Saint George, with the letters I. V. P. F. (*Justus ut Palma Florebit*). 3, An order instituted by Ernest Augustus of Hanover in 1839 and dissolved in 1866. 4, A Sicilian military order, instituted by Joseph Napoleon in 1808, remodeled by King Ferdinand IV in 1819 and dissolved in 1861. 5, The name under which the Order of the Garter was first instituted in England.

**George, SAINT** (?–303), the patron saint of England. His origin is very obscure, but it is claimed that he was educated in Cappadocia and suffered martyrdom there. He was adopted by the Genocse as their patron saint, and in 1222 the Council of Oxford ordered that his day (April 23) should be observed as a national holiday in England; in 1350 he was made the patron of the Order of the Garter by Edward III. The red cross of Saint George on a white ground is seen on the Union Jack and was formerly worn by the English soldiery. A legend which is doubtless an invention of the Middle Ages states that Saint George slew an immense dragon which was threatening to devour a beautiful princess.

**George Eliot.** See ELIOT, GEORGE.

**George Junior Republic,** a small organized community of boys and girls, near Freeville, N. Y., founded in 1895 by William R. George of New York. Its purpose is to give to neglected and unfortunate children the training which will equip them for performing the duties of



## Georgetown

citizenship and for earning an honest living. The community is a republic in form, governed by a constitution similar to that of the United States. Its officers are elective, and no office is now filled by an adult, the only limitation upon the powers of the youthful citizens being a veto power retained by the trustees. Children from twelve to eighteen years are admitted to the republic, and all members under sixteen must attend its schools. Training is given in profitable occupations, as farming, carpentry, printing, domestic science; and the equipment includes schools, hotels, stores, a bank, a library and numerous workshops.

**Georgetown**, the capital of British Guiana, near the mouth of the Demerara River. It is neatly built, consisting of broad streets at right angles, with canals in the middle, and lofty wooden houses, often with luxuriant gardens attached. The harbor is suitable for sheltering a considerable commerce, in which the chief exports are sugar, rum and coffee. The climate is exceedingly unhealthful, owing to the surrounding swamps. Population, 53,176.

**George Washington University**, THE. The George Washington University of the city of Washington, D. C., was originally chartered in 1821 as The Columbian College in the District of Columbia. It was, by act of Congress, changed to the Columbian University in 1873, and under act of Congress, Jan. 23, 1904, it became The George Washington University. Under this act the university was made non-sectarian and given power to organize colleges for carrying on educational work in arts, sciences and liberal and technical knowledge. The university comprises the Faculty of Graduate Studies, the Columbian College, the Washington College of Engineering, the Division of Architecture, the Faculty of Medicine, the Faculty of Dentistry, the Department of Law and Jurisprudence, the Department of Politics and Diplomacy and the National College of Pharmacy. In 1912 there were enrolled 1270 students. The faculties and teaching staff comprised 200 professors, assistant professors, instructors and lecturers. The university buildings are situated within the heart of the city, being but one block removed from the treasury department. As this location is now being sought for business purposes, property has been acquired within a short distance from the White House and beside the Park. The central location within the city enables the students of the university to make use of the unusually abun-

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dant supply of material collected by the United States government in its museums, libraries, laboratories and archives, which, by act of Congress, April 12, 1892, is accessible to scientific investigators and to the students of any institution of higher education now incorporated or hereafter to be incorporated under the laws of Congress or of the District of Columbia. According to the librarian of Congress, there are thus, in the city of Washington, "34 governmental libraries freely available for research. These libraries now contain in the aggregate over 2,000,000 books and pamphlets and over 500,000 other articles literary in character—manuscripts, maps, music and prints." The George Washington University offers an academic home to the advanced students of other universities of the United States, during their stay in Washington, to pursue their researches in the preparation of theses to be offered for degrees in the institutions from which they may come.

**Georgia**, *jor'je ah* (popularly called the EMPIRE STATE OF THE SOUTH), a South Atlantic state, the largest of the original thirteen, is bounded on the n. by Tennessee and North Carolina, on the e. by South Carolina and the Atlantic, on the s. by Florida and on the w. by Alabama. The length from north to south is 320 miles; its breadth, 259 miles; its gross area, 59,265 square miles, of which 540 are water surface. In 1900 the population was 2,216,329; in 1910 it was 2,609,121.

**SURFACE AND DRAINAGE**. A triangular section in the northern part of the state having an area of about 6000 square miles is crossed by the Blue Ridge, the Cohutta, Taylor's Ridge and other ranges of mountains, which extend in a northeast-southwest direction. All of this section has an altitude of 1000 or more feet, but there are no very high peaks among the mountains, the highest not reaching 6000 feet. Lookout Mountain, famous for its scenery and for famous battles of the Civil War, is partly in Georgia and partly in Tennessee. This entire region is interspersed with hills and valleys and is noted for the beauty of its scenery. In the extreme northwestern part of the state is located Chickamauga National Park, which is surrounded by hills and low mountains. To the southwest of the mountain region are the foothills, which extend for about 65 miles and form a section of country diversified by low hills and broad valleys. This is a portion of the Piedmont region, which extends southward through

## Georgia

the Carolinas (See PIEDMONT REGION). To the south and east of the Piedmont region is the coastal plain, which occupies fully one-third of the state. The surface of this region is low and level, and in the southeastern corner of the state, extending into Florida, is the great Okefenokee Swamp. Off the coast are a number of large islands, with low surface and fertile soil. Along the Fall Line, where the Piedmont region descends to the coastal plain, are rapids or falls in most of the streams, and the location of such towns as Augusta, Milledgeville, Macon and Columbus is accounted for largely by this fact, since the fall of the river furnishes excellent water power.

Georgia's drainage system comprises the whole or part of nine river basins, and the state contains an unusual number of large rivers. The extreme northwestern part is drained into the Tennessee. To the east and south of this system is the basin drained by the Coosa, formed by the junction of the Ostanaula and Etowah rivers. Lying southeast of these rivers is the valley of the Chattahoochee, through which the river flows diagonally across the state in a southwesterly direction until it reaches the western border, when it turns southward and forms the southern half of the western boundary. As it enters Florida it is joined by the Flint, the united streams being known as the Apalachicola. The Flint River flows southward through the western part of the state and is approximately parallel to the Chattahoochee through the greater portion of its course. The Ocmulgee and Oconee rise south of the Chattahoochee and flow southeasterly, uniting to form the Altamaha, which conducts their water to the Atlantic. The Altamaha is navigable to the junction of the rivers by which it is formed, a distance of 300 miles. South of the Altamaha is the Saint Mary's, forming a part of the boundary between Georgia and Florida. The Satilla is its chief tributary. The Savannah, with its extension, the Tugalo, forms the boundary between Georgia and South Carolina, and is navigable to Augusta, 300 miles. Many of these rivers furnish water power for manufacturing.

CLIMATE. The northern half of the state is characterized by a mild and salubrious climate. The winters are not cold nor the summers hot, and this region is enjoyed by people from the North who wish to escape severe winters. In the coastal plain the summers are exceedingly hot and enervating, and along the coast, especially where the land is marshy, malaria and fevers are likely to attack those who are not

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accustomed to residing in such localities. The middle portion of the state has an equable climate, somewhat warmer than that in the northwestern part. The rainfall varies, being heaviest in the north, but its average is about 49 inches for the entire state.

MINERAL RESOURCES. The mountainous region is rich in minerals, the most important of which are coal, iron, bauxite (the ore of aluminum), manganese, marble and granite, and throughout the state brick clay and pottery clay are abundant. The coal is of a semi-bituminous variety and is valuable for nearly all purposes. The quarrying of marble has become an important industry. The Georgia marble is of excellent quality and strength and has acquired a wide reputation as a building and finishing stone. Iron ore and manganese are also quite extensively mined. Among other minerals found in smaller quantities are gold, silver and a few precious stones, including the amethyst and beryl; but the mining of these is a comparatively small industry.

AGRICULTURE. Agriculture is the leading occupation, and nearly seven-tenths of the surface of the state is in farms. Cotton and corn are the most important crops, the islands along the coast being especially adapted to the growth of sea-island cotton, and the west central and southwestern portions being suited to the upland variety. The annual crop is about 4,500,000 bales, giving Georgia rank next to Texas in the production of this important crop. In the southern part of the state melons, peanuts, garden vegetables, oranges, pineapples, lemons and other semi-tropical fruits are raised in large quantities. The uplands in the interior furnish an abundance of pasturage, and sheep, cattle and hogs are raised in large numbers. As in other Southern states, many of the farms are rented to negroes, by whom most of the work is performed with simple tools and implements. Extensive areas are covered with forests. In the north, these include the hard woods, such as oak, hickory and maple, while in the south the long-leaved pine is the prevailing timber tree. /

MANUFACTURES. Since 1890 Georgia has made rapid strides as a manufacturing state, and in this regard she leads the Southern states. The most important manufacturing industry is that of cotton goods. A large number of mills are now in operation, and they have attained remarkable success. The production of hosiery and other knitted goods is also becoming important. There are also a number of mills for the



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manufacture of woollen fabrics. In the north-west are numerous iron works, and the manufacture of cotton gins and other machinery gives employment to a large number of people. The increased production in corn and wheat is also increasing the grist mill products from year to year. The production of lumber, turpentine and rosin is also very important, since Georgia is one of the leading lumber states of the South. Most of this product is sent to other states. While Georgia is excelled by some other Southern states in the production of cotton, she leads all in the variety and output of her manufactured products as a whole.

**TRANSPORTATION.** The large number of navigable rivers affords the state easy and cheap water transportation, but these are not as much used as formerly, because of the large number of trunk lines of railway now traversing the state in all directions. The important railway centers are Atlanta, Savannah, Augusta, Macon, Columbus, Athens and Waycross. By means of the numerous lines, which have a mileage of nearly 6000 miles, all important towns have railway communication, and every county is crossed by one or more lines, while the trunk lines form direct communication with northern states.

**COMMERCE.** The commerce of the state is important. The large output of cotton and marble, as well as the production of cotton goods and other manufactures, together with her lumber and forest products, gives Georgia an extensive export trade. The imports of the state consist of those manufactured goods and food products not raised with profit.

**GOVERNMENT.** The legislative department consists of a senate and a house of representatives, the members of each being chosen for two years. The senators are apportioned among districts, and the representatives among the counties, on the basis of population. The legislature holds annual sessions, which are limited to fifty days. The governor, comptroller-general, secretary of state and treasurer are elected by the people, the governor holding office for two years and being ineligible for four years after he has served two consecutive terms. The judicial power is vested in a supreme court consisting of a chief justice and five associates, chosen for six years by popular vote, and superior courts, which are held in each judicial district. The judges for these courts are also elected by the people for a term of four years.

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**EDUCATION.** The public school system is under the general direction of a state school commissioner and state board of education. There is a school fund of nearly \$2,000,000, which is supplemented by state and local taxation and also, to a small extent, by the Peabody Educational Fund for the purpose of conducting teachers' institutes and giving other instruction for the training of teachers (See PEABODY EDUCATIONAL FUND). In all of the larger cities and towns, graded schools for both colored and white pupils are established, and high schools are liberally supported in all the larger centers. General interest is taken in education, and the schools throughout the state are being brought to a higher degree of excellence from year to year. The University of Georgia, established at Athens, has a semi-official relation to the public schools and other higher institutions in the state. Among these are several branches of the university, namely, the technological school at Atlanta, the North Georgia Agricultural College at Dahlonega, the state normal school at Athens, the state industrial college for colored youth at College, and the Georgia Normal and Industrial College at Milledgeville. There are also numerous secondary schools and colleges throughout the state for both white and colored students, supported by the various religious denominations of the country.

**CITIES.** The most important cities are Atlanta, the capital and largest city; Savannah, the chief seaport; Augusta; Macon; Columbus; Athens, and Brunswick, each of which is described under its title.

**HISTORY.** The territory of Georgia was explored in 1540 by De Soto and in 1562 by Ribaut. It was a part of the original Carolina grant, but when the two Carolinas were made royal provinces the territory between Saint Johns and Savannah rivers was reserved as Crown land. In 1732 a company was organized by James Oglethorpe to found a colony in America as a refuge for poor debtors and religious fugitives of Great Britain and Germany. Savannah was established in the following year. The colony was liberally governed and prospered during its early history. An interesting event of Georgia's early history was the war with the Spaniards in 1740, in which, though unsuccessful, the English colonists proved to be brave and skilful fighters. Oglethorpe returned to England in 1743, and after his departure the colony rapidly declined under the unfortunate rule of his successors. At this time was introduced the

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trade in slaves and rum. The charter was surrendered in 1752, and Georgia was organized as a royal province. By the proclamation of 1763 the territory of Georgia was increased to include a strip of land extending to the Mississippi. Georgia bore her part in the Revolutionary War, following the lead of other states, and she suffered severely at the hands of the British and Tories. She ratified the Articles of Confederation in 1778 and was among the first to ratify the Federal Constitution (January, 1780). After the war the state was occupied with indian disturbances, which eventually brought it into collision with the United States government, regarding the control of indian lands. This was finally settled when the last of the Cherokees removed from the territory in 1838. In spite of the strong hold of slavery upon the commercial interests of Georgia, there was a decided Union sentiment in opposition to secession, led by Alexander H. Stephens, but the state seceded in January, 1861. It was the scene of important military operations during the Civil War, including the marches of General Sherman, and at the close of the struggle it suffered serious commercial depression. A bitter contest was waged in Georgia during reconstruction times, and twice the refusal of the legislature to conform to the requirements of Congress caused the state to be placed under military rule. She finally was admitted in 1871. During this time the carpet-bag government was in full force and the wealth of the state was wasted in wretched speculations and frauds. In recent years prosperity has returned, and the natural resources of the country are being rapidly developed. The state has been almost uniformly Democratic in state and national politics since 1872.

**Georgia**, a region in Transcaucasia, forming the main part of the Russian governments of Tiflis and Kutais and comprising the ancient kingdoms of Colchis, Iberia and Albania. Tradition traces the ancestry of the Georgians back to Japhet, but their history first becomes trustworthy at the time of Alexander the Great, when they were freed from foreign rule and united into one kingdom under Pharnabazus, 324 B. C. Toward the end of the fourth century they became Christianized. For a time they were under the Arab caliphs, but toward the end of the eleventh century they regained their independence. From 1184 to 1212 they were in the height of their prosperity under Queen Tamara, who married a Russian prince. In

## Geranium

1799 George XIII resigned his throne in favor of the Russian emperor Paul, and in 1802 Emperor Alexander proclaimed the territory a Russian province. The beauty of the Georgian men and women has long been famous.

**Georgia**, **STRAIT OF**, a large strait of the North Pacific Ocean, between the continent of North America and Vancouver's Island, about 250 miles long and 30 miles wide. It communicates with the ocean on the north by Queen Charlotte's Sound, and on the south by the Straits of Juan de Fuca.

**Georgia**, **UNIVERSITY OF**, a state institution of collegiate degree, which is at the head of the state system of public instruction in Georgia. It was chartered in 1785 and is the oldest state university in the country. According to the provisions of the charter, the primary and secondary schools of the state are officially connected with the university. The university proper is located at Athens and includes the Franklin College of Liberal Arts, the State College of Agriculture and Mechanic Arts, the law school and the graduate school. In addition to this, there are a number of other colleges, located in different parts of the state, which are affiliated with the university. The enrollment is about 1900 students of college grade, and the faculty contains over 160 members. Tuition is free to all residents of the state, except in the professional schools.

**Georgian**, *jor'jan*, **Bay**, a bay in Canada, formerly called Lake Manitoulin. It constitutes the northeast part of Lake Huron and is partly separated from the main body of the lake by the peninsula of Cabot's Head and the island of Great Manitoulin. It is about 120 miles long and 50 miles broad and contains a large number of islands.

**Gera'nium**, *je ra'ni um*, a family of plants of which there are many species. One genus, the popular name of which is *crane's-bill*, is found wild in parts of Europe and the United States. It is commonly cultivated because of the medicinal properties of the roots. A second genus, of which the common species is *alfilaria*, is common in the Pacific coast region, where it is valuable as a forage plant. Another genus comprises the common ornamental geraniums, so widely grown in gardens and houses. These plants are natives of the Cape of Good Hope and are popular because of their fragrant and brilliant flowers and their beautifully marked foliage. The commonest species are the *rose geranium* and the *scarlet geranium*.



**Gerard**, *zha rah'r'*, FRANCOIS PASCAL, Baron (1770–1837), a French historical and portrait painter, born at Rome. In 1786 he went to Paris and studied under David, whose style he followed. Some of his best works are *Blind Belisarius*, *Psyche Kissed by Cupid*, *Three Ages* and *Homer*. Among his portraits the most famous are those of Talleyrand, Talma, Louis Philippe, Madame Récamier and Mlle. Mars.

**Gerard**, JEAN IGNACE ISIDORE. See GRANDVILLE.

**German East Africa**, until 1916 the most important and largest of German colonies. It lies in Africa on the east coast, and is bounded on the e. by the Indian Ocean; on the s. by Portuguese East Africa and Lake Nyassa; on the s. w. by British Central Africa; on the w. by Lake Tanganyika and Kongo Free State, and on the n. by British East Africa. Its northern boundary crosses Lake Victoria Nyanza. The area is estimated at 384,180 square miles. The island of Mafia, off the coast, belongs to the colony. The coast of German East Africa is low and flat, but there are high plateaus in the interior, from which rise lofty mountain groups, among them Kilimanjaro, a volcanic peak 19,720 feet high and the highest point in Africa. The country is watered by the rivers Rfu, Pngani, Mgeta and Rufigi and their tributaries, none of which are navigable. There are some unimportant streams in the interior, which drain into lakes Tanganyika and Victoria Nyanza and thence into the Kongo and the Nile. The chief industries are agriculture and cattle-raising. Millet, wheat, cotton, sesame, tobacco, copra and rice are grown, and bananas are cultivated along the coast. The chief exports are ivory, rubber, cereals and coffee. Coal, iron, salt and a little gold have been found.

In 1916 the British army in Africa started a strong campaign to wrest the colony from the Germans, whom they had already deprived of German Southwest Africa. One of the policies of the entente allies in the War of the Nations (which see) was to capture all German colonies. After a brief effort the English succeeded in taking the colony, and its loss deprived Germany of its last holding in Africa. There was particular satisfaction in England over the outcome, for German possession of this colony always threatened the security of the Cape-to-Cairo Railroad, a necessary link reaching to the southern English colonies. The ultimate destiny of the colony is yet to be determined. Population, about 6,000,000.

**German Empire**, THE. See GERMANY.

**Germanicus Caesar**, *se'zahr* (15 B. C.–19 A. D.), a distinguished Roman general, son of Nero Claudius Drusus and Antonia, a niece of Augustus. When Augustus died in 14 A. D., Germanicus was invited by the rebellious legions on the Rhine to assume the sovereignty, but refused and quelled the revolt. Two years later he made his way into Germany, defeated the Cherusci under Arminius and made an incursion into the country of the Marsi. Tiberius grew jealous of his popularity, recalled him and sent him to Syria, where he died, probably poisoned by Piso, the governor of Syria.

**German Language**. The history of the German language is divided into three parts—Old High German, to 1100; Middle High German, from 1100 to about 1500; New High German, from about 1500 to the present time. The limits are approximately the same as those assigned to the three periods of the English language. The word “High” in each case has a purely geographical significance. In the earlier periods of the language, the dialects of South Germany are designated as High German, from the more mountainous character of those districts, while the language of North Germany was called Low German. The Low German dialects, as well as the High, were spoken in the periods referred to, but as the works of literature preserved belong chiefly to the latter dialects, the whole period is so characterized. By examination of dialectical peculiarities, scholars are able to locate specimens of literature from those periods with considerable exactness. In the same way to-day a German peasant's native province can be approximately determined. These peculiarities, which the printing press and a uniform educational system have obliterated in a great measure in the spoken language, especially in the last generation, still survive in the more isolated districts, and it is quite possible to find two peasants from different parts of Germany who cannot make themselves understood by each other. In modern printed German there are no considerable variations, but in speech even the educated will usually betray their dialect in some peculiarity of pronunciation or vocabulary.

The most powerful agency in fixing a common written language for Germany was Luther's translation of the Bible (1522), and this is conveniently made the beginning of the New High German period. The fact that this work had a wide circulation made its dialect, which was intermediate in character and geographical position.

familiar throughout Germany, and subsequent writers who wished to reach a large circle of readers naturally employed it. The first German grammar appeared in 1540, and subsequent grammars and dictionaries gradually fixed the forms of the language. The progress toward a uniform standard was slow, and the perfection of the language was not attained until the eighteenth century. The progress, as in the history of every language, was toward simplification of inflection and complication of syntax.

**German Literature.** See LITERATURE, subhead *German Literature*.

**German Silver** or **Nickel Silver** is an alloy of copper, nickel and zinc in different proportions, among which the following may be mentioned: Spoons and forks are made from two parts copper, one nickel, one zinc; knife and fork handles from five copper, two nickel, two zinc, a mixture closely resembling alloyed silver; addition of lead produces an alloy which appears well fitted for casts and for making candlesticks. Iron or steel, on the other hand, makes the alloy whiter, harder and more brittle. German silver is harder than silver and takes a high polish. It melts at a red heat, the zinc being volatilized in the open air. It is attacked by the strong acids; it is also affected by common organic acids, such as vinegar, and by some saline solutions.

**German Southwest Africa**, a former German possession on the western coast of Africa, extending for a distance of 900 miles, from the Orange River to the Cunene River, excepting Walvis Bay, which is a British possession. The area is estimated at 322,450 square miles. The north part of German Southwest Africa is called Damaraland, and the southern, Great Namaqualand. The region is mostly a plateau, with mountains rising in the Onatoka to a height of 8800 feet. The chief industry is cattle-raising. In the western part are fine pastures and much fertile land. Little has yet been done to develop the deposits of gold, copper and lead. The exports are ostrich feathers, hides, horns, ivory and wool. The harbors are poor, and most of the commerce passes through Walvis Bay. In 1915 British South African troops captured the small German force defending the colony and formally took possession of the region. Population, 200,000.

**Germantown**, **BATTLE OF**, an important battle of the Revolutionary War, fought October 4, 1777. A British force under General Howe was in possession of Germantown, a suburb of Philadelphia. The Americans under Washington attacked this position in two columns and

were at first successful, but a fog arose and two American forces approached one point from opposite directions and fired into each other's columns, immediately creating a panic among the Americans and causing defeat when victory was practically assured. The daring and skill of Washington's plan deeply impressed European military critics and was one of the causes which led to the French alliance.

Germantown was formerly a separate suburb of the city of Philadelphia, about 5 mi. n. of the center of the business district, but it is now included within the city limits. It is noted for the beauty of its surroundings and for its elegant homes, buildings and parks. It was settled in 1683 by Palatinate Germans; the first paper mill in America was established there in 1690, and the first American edition of the Bible was published there in 1743.

**German Universities.** See UNIVERSITY, subhead *German Universities*.

**Germany** or **The German Empire**, a country of Central Europe, lying between 47° 16' and 55° 54' north latitude and between 5° 52' and 22° 53' east longitude. It is bounded on the n. by the North Sea, Denmark and the Baltic Sea; on the e. by Russia and Austria-Hungary; on the s. by Austria-Hungary and Switzerland, and on the w. by France, Belgium and the Netherlands. Its length from east to west is 750 miles, and from north to south, 475 miles. The area is 208,830 square miles, or a little less than the combined areas of Colorado and Nevada. The coast line is 1200 miles in extent.

**SURFACE AND DRAINAGE.** Germany is naturally divided into three surface regions, the Alpine Foreland, the central highlands and the great plain. The first occupies the extreme southeastern portion of the country and contains a part of the Alps. There are found the highest elevations and the most rugged mountain scenery. To the north and west of this and separated from it by the basin of the Upper Danube is the central highland region, extending westward from the Carpathian Mountains to the Rhine and northward to within about 100 miles of the North Sea. The highland region is traversed by numerous ranges of low mountains, among the most important being the Harz, Riesengebirge, Vosges and Erzgebirge. All of these are low mountains with rounded summits which have been denuded of most of their soil. The valleys are comparatively shallow, having been filled with the debris carried from the mountains by ice. This portion of Germany



presents a diversified appearance of low mountains and broad valleys, and it is covered with a fine growth of vegetation and watered by numerous streams. To the north of the central highlands and occupying fully one-third of the country is the great plain, which extends from the eastern boundary to the North Sea. This is a portion of the great Asiatic plain, which covers a large part of eastern and northern Europe. This plain is not perfectly level; its highest portions are about 600 feet above sea level, and it has a gradual slope towards the north.

The rivers of Germany are divided by the central highland region into two systems, those flowing into the Black Sea and those flowing into the North and Baltic seas. Of the first system the Danube is by far the most important, and it drains only the southeastern portion of the Empire. The other system includes all of the other important rivers and drains most of the country. Going from the west eastward, these rivers, in order, are the Rhine, the Ems, the Weser and the Elbe, flowing into the North Sea; and the Oder and the Vistula, flowing into the Baltic. Of these the Rhine is the most important. It has its source in Switzerland and flows entirely across the country, as does the Elbe, which drains a good portion of Bohemia. The Weser and the Oder are limited to German territory, while the Vistula drains a large portion of Russia and simply finds an outlet through Germany. All of the important streams flowing into the Baltic empty into shallow lagoons, called *haffs*. Between the Oder and the Vistula are a number of less important streams, and the Memel drains the extreme northeastern section of the Empire.

The mountainous region in the south and southeast contains numerous lakes which in the clearness of their water and the picturesqueness of their surroundings resemble the lakes of Switzerland. In the lowlands in the northern and northeastern portion of the Empire there are also numerous shallow lakes. These have low shores, which rise gradually to the level of the surrounding country.

**CLIMATE.** Germany has a mild, temperate climate. The variation in temperature is more marked from west to east than from north to south. In general the temperature becomes lower as we pass from the southwest to the northeast, the altitude of the highland region offsetting in temperature whatever advantage might otherwise be gained by latitude. The western portion of the Empire has a higher annual temperature than the eastern, because of the influence of the

warm winds which blow from the Atlantic during a good portion of the year. The mean temperature for southern Germany in July is a little above 70°, while that for northern Germany is a little below 70°. The winter contrast between the western and eastern portions is noticeable in the condition of the rivers flowing into the North Sea and those flowing into the Baltic. The former are scarcely ever frozen, while the latter may be obstructed by ice for several weeks or even months. Because of the cold water in the Baltic, the spring in the northeastern portion of the Empire is cold and late.

The rainfall varies considerably in different localities, being heaviest in the mountain regions and along the western coast. In some sections it averages 40 inches per year, while in most regions the average is about 20 inches, and in a few localities it is less than this. The general average for the Empire is about 28 inches.

**MINERAL RESOURCES.** Germany is the leading country of the Continent in the production of coal and iron and is exceeded only by the United States and Great Britain among the countries of the world. The iron and coal regions are quite generally distributed over the country, but are most important among the highlands in the central and southern part. The greatest coal field is in the southwest and is an extension of the Belgian coal field. Other minerals of importance are silver, of which Germany produces about one-half of the entire output of Europe; copper, zinc, lead and nickel. Among the valuable stones are building stones of different kinds and lithograph stone. Salt is found in large quantities in some localities, as are compounds of potash, which are of great value in the manufacture of glass and other commodities.

**AGRICULTURE.** A little less than two-thirds of the land is devoted to agriculture, a little more than one-fourth of it is under forests and about one tenth is either unproductive or is covered by buildings. Agriculture is not the leading occupation, but it engages about one-third of the population. There is a greater variation in the size of farms than is found in France and Belgium, but the number of small farms is very large. There are over 3,000,000 farms with less than five acres each, while there are nearly a million ranging from 5 to 12 acres, and only a few exceed 250 acres. Many of the smallest farms are cultivated by those who devote a portion of their time to other occupations. The soil and climate are in general well adapted to agriculture, except in the northern and north-

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eastern portions, and even here the scientific methods of fertilizing and tilling the soil enable the farmer to reap good returns for his labor. The products vary widely, because of difference in soil and climate. In the southern portion of the Empire corn, hops and fruits are the most important products, except on the higher elevations, where rye, oats and potatoes are extensively grown. The northern portion of the country is largely devoted to the growing of grains, among which rye takes the leading place, followed by oats. Here, also, as well as in the central portion of the Empire, extensive areas are devoted to the raising of sugar beets and potatoes. Considerable barley and wheat are grown in these regions. The valleys of the Rhine, Moselle and a few other rivers are devoted almost entirely to the culture of the grape and the production of wine, and Rhine wines, because of their excellence, have become known throughout the world. In general, the most improved tools and agricultural implements are used, and the latest and most effective methods are employed by the German farmers, all of whom have received more or less technical education which they add to their practical experience in managing their farms. A very large proportion of the farms are tilled by the owners.

**MANUFACTURES.** Germany is one of the leading manufacturing countries of the world, being foremost upon the continent of Europe and exceeded only by the United States and the United Kingdom. The manufacturing industries include a great variety and are very generally distributed over the Empire. First in importance among these is the manufacture of textiles, including cotton, woolen and silk goods. Following these is the manufacture of iron and steel and their various products. In the production of some iron and steel goods Germany leads the world, particularly in the manufacture of hardware, including cutlery and tools, certain forms of heavy machinery and other articles, such as marine engines, heavy artillery and armor plate for battleships. The manufacture of chemicals, scientific instruments and small wares is also important, and in each of these lines the Germans exhibit great skill. Their scientific instruments are considered the most accurate in the world. Other important industries include brewing, dyeing, wood carving, type founding and the manufacture of jewelry, gold and silver ware and printers' supplies.

**TRANSPORTATION.** The Rhine, the Weser, the Oder, the Elbe and the Vistula are all navigable

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for long distances. Many of the other streams have been canalized, and all important navigable rivers are connected by canals, so that the Empire has a complete and convenient system of waterways, while the construction of the canal across the peninsula of Jutland has afforded a convenient and short outlet from the Baltic to the Atlantic (See KAISER WILHELM CANAL). The railway system is one of the most complete in the world and comprises about 39,000 miles, being exceeded only by the railroad systems of Russia and the United States. The railways of Germany are under a peculiar form of management, almost every system being managed by the government of the state in which the larger part of the system is located. Berlin is the great railway center, and from this city trunk lines extend not only to important points in the Empire but to all important cities of Europe. They are so numerous and so well managed that any point in the Empire can be reached within twenty-four hours. Carriage roads are numerous and good, and telegraph lines, telephone lines and the best of mail service are maintained by the government.

**COMMERCE.** Germany is one of the great commercial nations. The excellence of her manufactured products and the systematic method of introducing these to the various countries have enabled her to develop an extensive foreign trade. Her leading exports consist of manufactured goods, particularly textiles, iron and steel products, chemicals, dyes, malt liquors, scientific instruments, small wares, jewelry and gold and silver ware, while the chief imports consist of food stuffs and raw material for the manufactures. Large quantities of wheat are obtained from Russia, and the greater portion of the supply of cotton is imported from the United States. The annual foreign trade amounts to about \$2,500,000,000. Of this, the imports exceed the exports by about \$300,000,000. The chief countries with which this trade is carried on are the United Kingdom, the United States, Russia, France, Belgium, Netherlands and the countries of South America.

**INHABITANTS AND LANGUAGE.** The German people are principally of Teutonic origin, but those inhabiting some portions of the Empire are descendants from the Teutons and Celts. The people of the northern states are generally characterized by light hair and blue eyes, while those of the southern states, where the Celtic element is found, are of darker complexion. There are also in the Empire some Slavs and some Poles.



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The German language prevails, but the people inhabiting the lowlands of the North speak a different dialect from those in South Germany. Because North Germany is known as a low country and South Germany as a highland country, these dialects are usually distinguished as Low German and High German. The High German is in most general use and is gradually replacing the other dialect. See GERMAN LANGUAGE.

EDUCATION. Germany maintains one of the best systems of public education in the world, if not the best. For a detailed description, see EDUCATION, NATIONAL SYSTEMS OF, subhead *Germany*; UNIVERSITY, subhead *German Universities*.

LITERATURE AND ART. See LITERATURE, subhead *German Literature*; PAINTING; SCULPTURE, subhead *Germany*; ARCHITECTURE.

COLONIES. The German colonial possessions are located in Africa, Asia and the Pacific Ocean. Their area and estimated population are given in the following table:

GERMANY'S COLONIES AND DEPENDENCIES	ESTI-MATED AREA* IN Sq. MILES	ESTI-MATED POPU-LATION
IN AFRICA:		
Togoland.....	33,700	1,000,000
Kamerun.....	191,130	3,500,000
German Southwest Africa..	322,450	200,000
German East Africa.....	384,180	6,703,000
IN ASIA:		
Kiauchau (exclusive of the bay).....	200	32,000
IN THE PACIFIC:		
Kaiser Wilhelm's Land....	70,000	110,000
Bismark Archipelago.....	20,000	200,000
Caroline Islands..... }		
Palau or Pelew Islands.. }	560	60,000
Marianne Islands.....	250	2,000
Solomon Islands.....	4,200	45,000
Marshall Islands.....	150	15,000
Samoan Islands:		
Savaii.....	660 }	34,400
Upolu.....	340 }	
Total.....	1,027,820	11,901,400

\*The areas of these territories, especially those in Africa, are only approximately correct, in many cases, since the boundaries have not yet been definitely settled.

GOVERNMENT AND RELIGION. The German Empire is a federated state, comprising four kingdoms: Prussia, Bavaria, Württemberg and Saxony; seven grand duchies: Baden, Mecklenburg-Schwerin, Hesse, Oldenburg, Brunswick, Saxe-Weimar and Mecklenburg-Strelitz; four duchies: Saxe-Meiningen, Anhalt, Saxe-Coburg and Saxe-Altenburg; seven principalities: Waldeck, Lippe, Schwarzburg, Rudolstadt, Schwarzburg-Sondershausen, Reuss-Schleiz, Schaumburg-Lippe and Reuss-Greiz; three free cities:

Hamburg, Lübeck and Bremen, and the imperial province of Alsace-Lorraine. These states are federated under the constitution which was adopted in 1871. According to the agreements of federation some states enjoyed privileges not granted to others, since these concessions were necessary to induce them to join the confederation. The king of Prussia is by the constitution made president of the German Empire, with the title of emperor. His office is somewhat peculiar. It is hereditary in the male branch of the royal family of Prussia, and the emperor cannot be removed. He is not heir to a throne, but to an office. He summons, opens, adjourns and closes the houses of the federal legislature, appoints and removes the imperial chancellor and other high imperial officers, controls foreign affairs of the Empire and is commander in chief of the imperial army. He may, without consulting the legislature, engage in defensive war, but must have its approval to engage in offensive war. In addition to his duties as emperor, he has other duties and responsibilities as king of Prussia.

The chief executive officer under the emperor is the chancellor, who is appointed and removed by the emperor at will. The chancellor is chairman of the *Bundesrat*, or upper house of the legislature, is required to countersign all acts of the emperor except those which pertain to military affairs, and in so doing he assumes the responsibility for the acts, thus making the emperor irresponsible. He also, with the advice and consent of the emperor, appoints and removes all of the minor imperial officers and sees that the laws are promulgated and enforced, though the power of declaring a law suitable for promulgation lies with the emperor. The chancellor has a seat in the lower house of the legislature, or *Reichstag*, where his position is that of the defender of the government and the advocate of its measures. He is assisted in his duties by eleven secretaries, each of whom is at the head of a department of the government.

The legislative department of the Empire is vested in two houses. The *Bundesrat*, or upper house, is really a federal council and comprises a body of ambassadors sent by the different states. The members of this body can vote only in accordance with instructions which they receive from their respective states, and if they vote contrary to such instructions or without instructions on important questions the vote is not counted. The lower house, or *Reichstag*, is composed of members elected by popular vote for five years. This body is really the active

legislative branch of the government, as most measures originate in it and all must receive its sanction before they can become laws. The emperor is required to call the Reichstag together at least once a year, and he may adjourn it once during any session, provided the adjournment is for a period not exceeding thirty days. Under extreme circumstances the emperor, acting with the Bundesrat, may dissolve the Reichstag and call for a new election. In such case the election must be held within sixty days and the newly elected body must assemble within ninety days from the date of dissolution. Suffrage is restricted to men twenty-five years of age and over. There are also a few minor restrictions in regard to crime, military service and inability to pay taxes.

The judicial department of the Empire is provided for by statute and not by the constitution. The only imperial court provided for in the constitution is the Federal Council, or Bundesrat, which has authority to settle questions in dispute between the different states and the Empire. A uniform system of courts and criminal law was created in 1877 and the years immediately following. In accordance with this system four grades of courts were established, the lowest being the district court, which takes cognizance of petty cases, both civil and criminal, similar to those tried in justice courts in the United States. The courts of next higher grade are known as territorial courts and consist of from three to five judges. These hear cases appealed from lower courts and have original jurisdiction in civil and criminal cases of greater magnitude. In the trial of important criminal cases juries are employed. Above the territorial courts are the superior courts, which are wholly courts of appeal, and at the head of the system is the imperial court, which is located at Leipzig and is composed of 90 judges, divided into 4 criminal and 6 civil senates. The judges of this court are appointed by the emperor upon nomination by the Federal Council and their office is for life.

The affairs of the different states are managed by their own system of laws and the officials which they elect. In case such laws conflict with the imperial decrees they must be amended or repealed.

**CITIES.** Germany is a densely populated country and in 1911 had twenty-three cities with a population of over 200,000. The largest, in the order of their importance, were Berlin, the capital, Hamburg, Munich, Leipzig, Dresden, Breslau, Cologne, Frankfort, Nuremberg, Hanover,

Magdeburg, Düsseldorf, Chemnitz, Stettin and Essen, each of which is described under its title.

**HISTORY.** Although mention is made as early as the time of Alexander the Great of German tribes on the Baltic coast, the first important occurrence in connection with them of which we have any authentic record was their defeat of the Roman consul Papirius, in 113 B. C. In 102 B. C. the Teutones were defeated by the Roman general Marius. Julius Cæsar, in his *Commentaries*, gives an account of certain Germanic tribes whom he found between the Rhine and the Vosges, and he came into conflict in Gaul with a German king, Ariovistus. The name Germani was not used by the Germans in reference to themselves, but was probably formed by the Romans from a Gallic word. At various times in Roman history the Romans were concerned with different German tribes, and by the beginning of the Christian era Roman dominion had been firmly established in Germany. When an attempt was made in 9 A. D. to force Roman customs upon the German peoples, they rebelled under the leadership of Arminius (See ARMINIUS) and completely defeated the Romans.

The Romans never again established themselves in Germany, and in the early centuries of the Christian era they were often forced to defend themselves against the invasions of powerful German tribes, chief among whom were the Alemanni, the Franks, and later, the Vandals, the Suevi, the Goths and the Lombards. Tacitus, in his *Germania*, gives a valuable and interesting account of the customs and lives of the early Germans. By 486 the ambitious Frankish chief Clovis had defeated the Romans in Gaul, and had set up his court on the future site of Paris. From the time of Clovis to the Treaty of Verdun in 843, the history of Germany is identical with that of France (See FRANCE, subhead *History*; CHARLEMAGNE). By the Treaty of Verdun, Louis, the son of Louis the Pious, Charlemagne's son, received that division of Charlemagne's great empire which corresponded to modern Germany, and at that time the history of Germany as a separate country began. Louis reigned until 876 and made some advancement toward national unity. The son of Louis, Charles the Fat, succeeded for a time in reuniting the three kingdoms—France, Italy and Germany—but as he was unable to defend his empire against the Northmen, the nobles deposed him and elected his nephew, Arnulf, in his stead (887). On the death of Louis the Child, the last of the Carlo-



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vingian dynasty, Conrad of Franconia was elected king. His reign was occupied with futile attempts to protect Germany against the invading Hungarians, and also with his quarrels with his powerful nobles. The most powerful of these, Henry of Saxony, succeeded Conrad in 919 as Henry I (the Fowler), first of the Saxon line. He is considered the creator of the German Empire. He united the dukedoms under his rule, built fortresses, reformed the military system and defeated the Wends and Hungarians. Otho I, son of Henry, came to the throne on his father's death in 936, and under him the royal power was greatly increased. He restricted the power of the nobles, defeated the Hungarians on the Lech in 955, acquired the crown of the Lombards in 961 and in the following year assumed the imperial title, thus founding the Holy Roman Empire, which existed until 1806 (See HOLY ROMAN EMPIRE).

Otho reigned until 973 and was succeeded by his son, Otho II (973-983), a well-meaning but somewhat weak monarch. Under Otho III, a young and enthusiastic king who was desirous of setting up a world empire with Rome as its capital, Germany was greatly neglected for Italy, and thus a condition of anarchy grew up. Henry II (1002-1024), the last king of the Saxon house, devoted more of his attention to his German than to his Italian possessions, and matters mended somewhat in Germany.

The first of the Franconian kings, Conrad II (1024-1039), was an energetic monarch who subdued the nobles and recovered the lands of the crown, and his work was carried on ably by his son, Henry III (1039-1056). During the reign of Henry III the right of the pope to interfere constantly in the affairs of the Empire was seriously questioned, and had Henry lived longer he might have put an end to this interference. His son, Henry IV, was an able king, but his constant troubles with the pope allowed his great nobles to increase greatly their own powers (See HENRY IV, Holy Roman emperor). The decline of the royal power continued under Henry V (1106-1125) and Lothair (1125-1137), so that the title of emperor became almost an empty honor.

The period of the Hohenstaufen emperors, which began in 1138, is the most famous in medieval German history. It is marked by a bitter conflict between the imperial and the papal powers and by the beginning of the Crusades. Conrad III (1138-1152), the first of the Hohenstaufen emperors, took part in the

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Second Crusade, and Frederick Barbarossa (See FREDERICK I, Barbarossa), one of the ablest of the Hohenstaufen emperors, was drowned during the Third Crusade. Frederick's son, Henry VI (1190-1197), by marriage inherited the kingdom of Naples and Sicily, which remained in possession of the Hohenstaufens until 1265. The possession of this territory by the emperors was a great injury to Germany, because it led them to neglect their German subjects. Henry VI attempted to make the imperial crown hereditary. The remaining kings of this line were Philip of Suabia (1198-1208), Frederick II (1215-1250) and Conrad IV (1250-1254). The period is filled with contentions with the popes and the Italian cities and with constant internal strife. The royal power became insignificant, and neither German king nor Roman emperor in reality existed. Some of the rulers seemed little concerned about Germany, dividing their time between Sicily and the Crusades, and Frederick II, one of the ablest of medieval rulers, was not in Germany for fifteen consecutive years.

The period between the death of Conrad IV in 1254 and the election of Rudolph of Hapsburg in 1273 is known as the Great Interregnum. The right to choose the emperor had been gradually usurped by a few of the powerful nobles, who were called electors, and on the extinction of the Hohenstaufen line these electors practically offered the crown for sale. Various bidders appeared, and the two offering the largest bribes, Richard of Cornwall and Alphonso of Castile, were elected, but neither of them was crowned emperor at Rome nor acquired any real power. Finally, in 1272, the pope ordered a new election, and in the following year Rudolph I (1273-1291), of the House of Hapsburg, was raised to the throne. He in a measure restored order and strengthened the royal authority. Through his defeat of Ottokar II of Bohemia he acquired lands in southeastern Germany, the most important being Austria. This his son Albert received with the title of duke, and from this dates the rise of Austria and the House of Hapsburg (See AUSTRIA-HUNGARY, subhead *History*). During the fourteenth and part of the fifteenth centuries there was but little of interest in the history of Germany. The imperial crown was passed around from one house to another and was openly offered to the highest bidder, the only care of the electors being to choose a prince not strong enough to endanger their authority. At one

time there were three rival emperors ruling simultaneously. The first noteworthy event, besides the revolt of the Swiss, was the promulgation in 1356 by Charles IV (1348-1378) of the Golden Bull, which secured to four secular and three ecclesiastical princes the right of election and defined their power. This decree was in force till 1806. Another noteworthy event was the war of the Hussites (See HUSSITES).

In 1438 Albert II of Austria was elected emperor, and from this time until the dissolution of the Empire in 1806 the crown was regarded as hereditary in the Hapsburg family, although the electors always made a formal choice. The greatest of the Hapsburg emperors in the Middle Ages was Maximilian I (1493-1519) (See MAXIMILIAN I). His reign marks a strong tendency toward centralization and the material growth of the imperial authority. He was succeeded by his grandson, Charles V (1519-1556). Charles bestowed the Austrian possessions of the House of Hapsburg on his brother Ferdinand, who may be said to have founded the monarchy of Austria-Hungary. (For the events of this important reign see CHARLES V, Holy Roman emperor; REFORMATION, THE; LUTHER, MARTIN.) The Peace of Augsburg (1555), with which the struggle between the Catholics and Protestants for the time terminated, granted to the Lutheran states the right to establish the Protestant worship. Three provisions of the Peace of Augsburg were later the cause of much trouble. These were the provision that each prince could choose his state religion and banish all subjects not conforming to it; that any ecclesiastical prince on becoming a Protestant was required to give up office and lands, and that all lands not secularized in 1552 should forever belong to the Catholics.

During the reign of Charles's successor, Ferdinand (1556-1564), a counter reformation was begun by the Roman Catholics, and this movement spread rapidly and was continued during the reigns of Maximilian II (1564-1576) and Rudolph II (1576-1612). While Matthias (1612-1619) was on the throne, his cousin Ferdinand was crowned king of Bohemia (1617), and the attempt to force the Protestants of that country to accept him as their ruler led to the outbreak of the Thirty Years' War (1618-1648) (See THIRTY YEARS' WAR). The struggle closed in the reign of Ferdinand III, by the Peace of Westphalia (See WESTPHALIA, PEACE OF). Germany by this treaty was cut up into

over two hundred independent states, which owed only a nominal support to the emperor and which became in fact simply petty monarchies. The imperial authority was completely wrecked and never afterward recovered. The war had devastated and impoverished Germany beyond measure, national feeling had been crushed out and all unity had been destroyed. Most of the rulers of the states were despots, who desired only to pattern themselves after Louis XIV, the absolute monarch of France. The War of the Palatinate (1689-1697), undertaken by Louis XIV, increased the desolation of the country.

The interest of German history after the Treaty of Westphalia centers largely in the rise of Prussia (See PRUSSIA, subhead *History*). The Great Elector, Frederick William (1640-1688) gained increased territory for his state, and by strengthening the royal authority and forming a standing army brought Prussia rapidly forward. His son Frederick III (1688-1713), added to his title of elector of Brandenburg that of king of Prussia (1701). Nominally, the king of Prussia was still subject to the emperor, but from this time on, the emperors were in fact merely rulers of Austria, and the imperial dignity was but an empty honor. With the death of Charles VI (1711-1740), the male Hapsburg line became extinct. The attempt of Charles to secure by the Pragmatic Sanction his dominions to his daughter Maria Theresa, brought on the War of Austrian Succession (See SUCCESSION WARS). After a two years' interregnum, the electors chose Charles VII of Bavaria as emperor (1742-1745), and on his death Maria Theresa's husband, Francis I (1745-1765), was elected. His successor, Joseph II (1765-1790), tried to establish the imperial authority in southern Germany, but was prevented by Prussia. In 1756 war broke out between Maria Theresa and Frederick the Great of Prussia (1740-1786). The advantage was decidedly with Frederick, and under this great ruler, whose statesmanship was as remarkable as his generalship, Prussia became the equal of Austria and showed herself as the one possible center for a united Germany. The French Revolution destroyed the remnant of the Empire, and after the formation by a number of German states in 1806 of the Confederation of the Rhine, under the protectorate of Napoleon, Francis II formally resigned the imperial crown and the Holy Roman Empire ceased to exist.

Napoleon's plan to add Germany, or at least



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the states of the Confederation, to his empire, was frustrated, and at the Congress of Vienna, which met to restore order out of the chaos into which European affairs had been plunged, the German states were organized as a confederation, with the emperor of Austria as president (1815). The various German states were independent in internal affairs, and interstate disputes were to be settled by a diet. Each state was to have a constitutional form of government, but this provision was little observed until the revolutions of 1830 and 1848 forced the German rulers to accede to the demands of their subjects. In 1830 was formed the Zollverein, which secured free trade among the several states. In 1848 a national assembly met at Berlin for the purpose of framing a national constitution, but the rivalry of Austria and Prussia prevented any successful results, and the Prussian king, Frederick William IV, refused the offer of the title of emperor of the Germans. Frederick William IV was succeeded in 1861 by William I (1861-1888), who soon called into his ministry Bismarck (See BISMARCK-SCHONHAUSEN, KARL OTTO EDUARD LEOPOLD VON, Prince). His policy of "blood and iron" made possible the final firm union of the German nation. The rivalry between Prussia and Austria was encouraged by Bismarck, who was making ready for the struggle which he knew would come. The final cause of the outbreak was the contention over Schleswig-Holstein, which had been taken from Christian IX of Denmark (See DENMARK, subhead *History*). War began between Austria and Prussia in 1866 (See SEVEN WEEKS' WAR). The outcome was complete success for Prussia, and in 1867 the North German Confederation was formed, with the king of Prussia as president. The Catholic states of the south, Bavaria, Baden and Württemberg, held aloof. Just before the close of the Franco-German War, they joined the Confederation. The cause of this war was the hatred and jealousy with which France viewed the rising power of the Hohenzollerns (See FRANCO-GERMAN WAR).

By the treaty which followed the Prussian victories, France lost Alsace and Lorraine and was compelled to pay a large indemnity. The most important result to Germany, however, was the enthusiasm and the spirit of nationality awakened by the Prussian success. The German Confederation was changed to the German Empire, and William I, king of Prussia, was proclaimed German emperor on January 18, 1871. The title was to be hereditary in his

## Germination

family, and it descended at his death to his son, Frederick III. Frederick III lived but a few months after his accession and was succeeded by his son, William II. William at once showed his intention to keep personal control of the government and accordingly in 1890 dismissed Bismarck, who did not approve of his policy.

About 1883 Bismarck aided in the formation of the Triple Alliance, which included Prussia, Austria-Hungary and Italy, and this was renewed in 1891 by Caprivi, the successor of Bismarck. Caprivi was succeeded in 1894 by Hohenlohe, during whose chancellorship rapid progress was made in the extension of German dominion in Africa. The murder in 1898 of two German missionaries in China gave Germany a pretext for demanding the cession of the port of Kiaochau in Shantung, China, and the murder of the German ambassador in Peking in 1900 compelled Germany to take a prominent part in the expedition of the European powers against China. Under Count von Bulow and Theobald von Bethmann-Hollweg, the succeeding chancellors, Germany's vigorous foreign policy was continued. In 1914 Germany's support of Austria's attitude toward Servia led to a general European war. See AUSTRIA-HUNGARY, subhead *History*; WAR OF THE NATIONS. Population in 1910, 64,896,881.

**Germination**, *jur min a'shun*, the term primarily used to denote the first growth of a plant from its seed, and, in general, to signify the development of germs, either vegetable or animal. The seed contains two parts, the *embryo*, or miniature plant, and the *cotyledons*, or seed leaves, in which the food for the embryo is stored. Some seeds, such as the squash and pea, have two cotyledons; some, like those of Indian corn and wheat, have but one, while others, like those of the pine family, have more than two.

Germination depends upon certain conditions of heat, light, air and moisture. These vary for different species, and to some extent within the same species. Indian corn will not germinate in a temperature below 48° F. nor above 115.2° F., while about 98° is the temperature that secures the most favorable results. Wheat has a range extending from 41° to 108.5°, with about 84° as the most favorable temperature.



BEAN

## Germ

The bean and squash afford good examples of one type of germination for seeds having two cotyledons. In the bean the nourishment is stored in the cotyledons in such a way that these appear above ground with but slight changes in form or color.

As the nourishment is absorbed these leaves wither and fall; in the meantime the first pair of true leaves has developed and the root has taken hold on the soil, so that the plant is prepared to obtain its nourishment from the earth and air.

The pea represents another type of dicotyledonous seeds. Here the cotyledons are so full of nourishment that they cannot appear as leaves at all; they consequently remain in the ground while their nourishment is absorbed. In this type of germination, the first leaf that appears is a true leaf of the plant.

Indian corn affords a good illustration of the germination of seeds having only one cotyledon. In this case the nourishment is stored at one end of the seed, the large end of the kernel; it is absorbed while the seed remains under ground, as in case of the pea, and the first leaf appearing is a true leaf of the plant.

The plant food is stored in the seed in the form of starch and albumen, both of which are insoluble. Before these substances can be available for nourishment they must be changed into soluble compounds. When the seed is planted, it absorbs moisture and swells; fermentation sets in, oxygen is absorbed and the starch is changed to sugar and dextrin, both of which are soluble. These chemical changes are accompanied with a rise of temperature. After a few days the seed bursts open, and the sprout or plumule appears. This is frequently called the radicle, though it is not the root. The direction of the plumule is at first downward, but it soon bends upward, and at the point of curvature it sends out a second shoot, which forms the rootlet.

**Germ**, *jurmz*, in medicine, tiny organisms, either plant or animal, believed to have some relation to disease. See BACTERIA AND BACTERIOLOGY; GERM THEORY OF DISEASE; DISEASES OF PLANTS.

## Germ Theory of Disease

**Germ Theory of Disease**, the theory that certain diseases are communicated from an infected person to an uninfected one by living organisms, which gain access to the body of the afflicted person by the air, food or drink, and which, growing and multiplying in the body they invade, produce changes characteristic of special diseases. The period during which the organisms retain their vitality, like the rate of their growth and multiplication, varies in different cases, but it is limited in all. Few, if any, resist the destructive influence of a temperature of 300° F., while most succumb at the temperature of 200° or even less, particularly if exposed for some time. Animal poisons generally are destroyed by boiling, and clothes, sheets or whatever is infected, may be rendered pure by being exposed to a temperature of 300° F. The living organisms, known as bacteria, microbes, micro-organisms or germs, are divided into several classes (See BACTERIA AND BACTERIOLOGY).

Doctor Koch, of Berlin, published in 1876 a paper giving a full account of the life history of the organism which had been observed in animals dead of splenic fever; and in 1877 the great French chemist Pasteur proceeded to investigate the subject, and his investigations conclusively support the germ theory of disease. In 1882 Doctor Koch announced the discovery of a micro-organism believed to be the chief, if not the only, cause of consumption of the lungs. These microbes are found not only in the lungs of persons who have died of tuberculosis, but also in the spit of tubercular and consumptive patients, and they multiply by spores. Thus it is that the spit of a consumptive patient, even after it has dried up, may be capable of imparting the disease, owing to spores being scattered in the air. After the epidemic of cholera in Egypt in 1883, which spread to France and Italy, investigations were undertaken by French, German and British commissioners. Doctor Koch detected a peculiar bacillus, shaped like a comma (,), in the intestines of persons who had died of cholera and he believed that this bacillus was the active agent in the production of the disease. In similar fashion diphtheria, lockjaw, pneumonia, typhoid fever and other diseases have been proved to be of bacterial origin. Hydrophobia, measles, scarlet fever, smallpox and whooping cough and other diseases are attributed to germs which have not yet been fully identified. Indeed, investigation seems to point to the fact that every infectious or contagious disease is



PEA AND CORN



## Gérôme

due to some form of micro-organism, and that there is one particular organism for each particular disease. Each organism produces its own disease and none other; and the special disease cannot arise unless its germ has gained entrance to the body. The channels through which these germs obtain entrance are innumerable, but they have one origin and one only, and that is a preceding case of disease. The "germ theory" affords the hope and suggestion of a method of diminishing, if not of getting rid of, such diseases altogether, and to some extent it also indicates the direction in which their cure is to be sought. If the particular microbe of each contagious disease were known, the condition of its life and activity understood, there is great probability that its multiplication in the living body could be arrested and the disease could thus be cured. Even without such knowledge, however, the germ theory indicates that the means for arresting the spread of contagious diseases and diminishing their occurrence consist in preventing the spread of the germs from an existing case of disease. See ANTISEPTIC; SANITARY SCIENCE; SURGERY.

**Gérôme**, *zha rome'*, JEAN LEON (1824-1904), a French artist, born at Vesoul. He went to Paris and studied under Paul Delaroche. In 1853 he traveled in the East, where he obtained the material for most of his pictures. Among his famous paintings are *Gladiators before Caesar*, *Slave Market at Rome*, *Cleopatra and Caesar* and *The Duel after the Ball*. Gérôme was also noted as a sculptor.

**Geronimo**, *je ron'i mo* (?-1909), an Apache chief, who in the years 1884-1886 terrorized the settlers in New Mexico and Arizona. In the latter year General Crook with a force of regulars was sent against Geronimo's band. The terms of surrender were agreed upon, but before they could be carried out the Indians had escaped. General Miles, who succeeded Crook, organized a vigorous campaign, and a detachment of his troops captured Geronimo, who was sent to Fort Pickens, Fla. Later he was sent to Fort Sill, Okla.

**Gerry**, ELBRIDGE (1744-1814), an American statesman, born in Marblehead, Mass. He graduated at Harvard in 1765 and was elected to the Massachusetts Assembly in 1773. He was a member of the Continental Congress of 1776 and served on several important committees. Gerry was a delegate to the constitutional convention, but did not approve of the instrument and refused to sign it. In 1789 the Anti-Federalist party elected him to the first national

## Gettysburg

Congress. He was one of the envoys sent in 1797 to establish diplomatic relations with France. His colleagues, Marshall and Pinckney, being Federalists and out of sympathy with France, were ordered to quit France, but Gerry was permitted to remain; and he did remain, to the indignation of many Americans, until his recall was ordered. Elected governor of Massachusetts in 1810, Gerry, who was a keen partisan, replaced Federalist office-holders with Republicans and also unfairly rearranged the districts of the state so as to secure the advantage to his own party—a maneuver for which his opponents coined the word *gerrymander*, and which has since been frequently used. He was defeated in 1812, but his party rewarded his zeal by electing him to the vice-presidency of the United States, in which office he died.

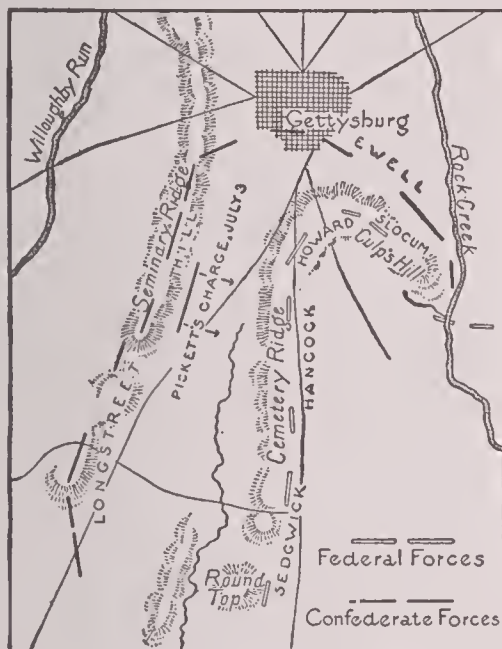
**Ger'ryman'der**, a word used in the United States to denote an unfair distribution of election districts within a state. The word was first used in 1812, when, under the administration of Governor Elbridge Gerry, the Republicans and Federalists being nearly equal in strength in Massachusetts, a redistribution of senatorial districts was made, so that those counties that returned large Federalist majorities were grouped together, thus reducing the representation of the Federalist party in the legislature. One district under the new law was so irregular in outline that it somewhat resembled a salamander, hence the name *gerrymander*. This scheme for perpetuating the power of a political party has frequently been used since that time.

**Gethsem'ane** (oil press), an olive garden or orchard in the neighborhood of Jerusalem, memorable as the scene of the last sufferings of Jesus Christ. The traditional site of this garden is on the east side of the city, a little beyond the Kedron, near the base of Mount Olivet. It contains some very old olive trees, piously regarded as having stood there in the time of Christ, but it is claimed all the trees were cut down during the siege of Jerusalem by Titus. The nearly square garden has been enclosed by the Latins, while the Greeks have enclosed a smaller space a little farther north as the true site of Gethsemane.

**Get'tysburg**, BATTLE OF, a decisive battle of the American Civil War, fought July 1-3, 1863, at Gettysburg, Pa., between the Federal army of the Potomac, numbering about 93,000 men, under General Meade, and the Confederate army of Northern Virginia, numbering about 80,000 men, under General Lee. On July 1, the two armies came together at the little village

## Geyser

of Gettysburg, the Federals having closely followed the Confederates in their advance northward from Fredericksburg. The Federals occupied a strong position on a line of bluffs south of the town; the Confederates formed their lines on a parallel ridge, about a mile distant. On July 2, the Confederates made a vigorous attack, drove back the Union left and gained a position on the right which seriously menaced the whole line. On the morning of the third, the Northern soldiers drove the Confederates out of this advanced position and repulsed a brilliant



BATTLE OF GETTYSBURG

charge by Pickett's men against the center of the line on Cemetery Ridge. Lee was therefore compelled to retreat across the Potomac. This battle marked a turning point in the Civil War. Thereafter the fortunes of the South gradually failed. The total loss on the Federal side was 3072 killed, 14,497 wounded and 5434 captured or missing. The loss on the Confederate side was 2592 killed, 12,709 wounded and 5150 captured or missing. See CIVIL WAR IN AMERICA. Consult Doubleday's *Chancellorsville and Gettysburg* in the Campaigns of the Civil War series.

**Geyser**, *gi'zur*, a spring which at intervals throws out quantities of hot water and steam. A geyser has a funnel-like opening, which extends to hot rocks below the surface. It was probably formed by the water which, when hot, dissolved the siliceous matter. The eruptions occur at intervals, being regular in some geysers and very irregular in others. They are usually more frequent in small than in large springs. Various theories have been advanced to account

## Ghebers

for the eruption, but all agree that it is caused by steam, the difference in theories being as to the way in which the steam acts. It is altogether probable that as the opening fills with water and becomes closed, the pressure causes the water at the bottom to become hot far above the boiling point (See BOILING POINT) at the surface. The temperature continues to increase until finally a small portion of steam escapes and forces some of the water out of the funnel. This in a measure relieves the pressure and the high temperature of the water causes it instantly to be converted into steam, which forces the water out through the funnel, often throwing it to the height of two hundred feet or more. The duration of an eruption varies from a few minutes in a small geyser to some hours in the largest. The water holds siliceous matter and carbonate of lime, which it deposits about the crater, making beautiful and fantastic formations, varying in color from white to blue and yellow.

The geyser regions of the world are found in Iceland, New Zealand, and in and about Yellowstone National Park in the United States. The last is by far the most remarkable and the most widely known. In 1904 a new geyser made its appearance in New Zealand, which is claimed to be larger than any other in the world. For a description of the geyser region of the Yellowstone, see YELLOWSTONE NATIONAL PARK.

**Ghats**, *gahts*, or **Ghauts**, two ranges of mountains in the peninsular portion of Hindustan. The general elevation of the Western Ghats varies from 4000 to 7000 feet. They form a watershed, and the rain collected on the eastern slopes makes its way across India to the Bay of Bengal. The Eastern Ghats have an average height of 1500 feet and extend for a distance of 500 miles.

**Ghazze**, *gaz'za*. See GAZA.

**Ghebers**, *ge'burz*, **Gabers**, *ga'burz*, or **Guebers**, a name given to the fire worshipers of Persia, represented in India by the Parsees. The original Ghebers or followers of Zoroaster are now represented almost solely by the few who inhabit the cities of Yezd and Kirman and the adjoining villages. As supreme deity they recognize Ahuramazda or Ormuzd, the principle of light and source of all that is good; and his opposite and antagonist, Ahriman, is the evil principle. Among the leading practices of the Ghebers may be mentioned their refusal to contract marriages with those of other creeds, their objection to eating beef or pork or to partaking of anything cooked by one of another religion.



## Ghent

When, in 1651 A. D., Yezdegird, the last of the Sassanides, was defeated by the caliph Omar, the majority of the Persians embraced Islamism. Those who continued Zoroastrians received the name of Ghebers, or infidels, and were subjected to persecutions so severe that the majority emigrated to India, where they became known as Parsees.

**Ghent**, *gent*, not *jent*, a town in Belgium, capital of the province of East Flanders, situated in a fertile plain at the junction of the Lys and Scheldt rivers, 31 mi. n. w. of Brussels. It is more than 8 miles in circumference and is divided by canals into a number of islands, connected with one another by bridges. Among the notable buildings are the Cathedral of Saint Bavon; the Church of Saint Nicholas (begun in the tenth century); the Church of Saint Michael; the university, a handsome modern structure with a library of about 100,000 volumes and 700 manuscripts; the Hôtel-de-Ville; the townhall; the Palace of Justice, and the Institute of Sciences. It also has many parks, gardens and promenades. Ghent has long been celebrated as a manufacturing town, especially for its cotton and linen goods and lace, but it has declined decidedly in importance in recent years. Other industries of importance are sugar refining and the making of hosiery, thread, ribbons, instruments in steel, carriages, paper, hats and delft ware, and the raising and exportation of flowers. Ghent was founded before the seventh century, was fortified by Baldwin, first count of Flanders, in the ninth century, and took a prominent part in European history, especially in the struggle for religious and political liberty. In 1792 the Netherlands fell under the power of France, and Ghent became the capital of the Department of Escaut (Scheldt). In 1814 it became, along with Flanders, part of the Netherlands, till the separation of Belgium and Holland. The treaty which ended the War of 1812 was signed here. Population in 1910, 166,445; with suburbs, 210,428.

**Ghent**, TREATY OF, between the United States and Great Britain, at the end of the War of 1812, signed December 24, 1814, and ratified February 17, 1815. It restored all territory to its position at the beginning of the struggle, provided for commissions to settle the boundary by the treaty of 1783 and bound both parties to attempt the abolition of the slave trade. It failed, however, to dispose of the chief causes of the war, including the impressment of American seamen, the participation of Americans in Newfoundland fisheries and the rights of neutrals.

## Ghosts

**Ghibellines**, *gib'el linz*. See GUELPHS AND Ghibellines.

**Ghiberti**, *ge bair'te*, LORENZO (1378-1455), an Italian goldsmith and sculptor, born at Florence. His first work of importance was the painting of frescoes at Rimini, in the palace of Pandolfo Malatesta. In 1401 the priori of the society of merchants at Florence invited artists to propose models for the bronze doors of the baptistry of San Giovanni. The judges selected the works of Brunelleschi and Ghiberti, but Brunelleschi withdrew. After twenty-one years' labor Ghiberti completed the doors, and they were so greatly admired that he was requested to execute the east doors. Michelangelo said that they were worthy of adorning the entrance of paradise. The first door consists of twenty-eight panels, representing the life of Christ, the fathers of the church and the evangelists, far surpassing anything of the kind attempted since the days of the ancient Greeks. The reliefs on the east doors represented subjects from the old Testament, the finest being *Creation of Adam*, *Creation of Eve*, *Fall of Man*, *Expulsion from Paradise* and *Moses upon Sinai*. Among Ghiberti's other works are bas-reliefs, statues, and some excellent paintings on glass, most of which may be seen in the cathedral and the Church of Or San Michele at Florence. Ghiberti also figures as an architect, though he did not excel in this branch of art. His *Treatise in Architecture* shows a poor understanding of the art.

**Ghirlandaio**, **Ghirlandajo**, *geer'lan dah'yo*, or **Corradi Domenico** (1450-1495), one of the older Florentine painters, born at Florence. His first work of importance, frescoes in the Sistine Chapel, are excellent in composition and perspective. The figures are graceful and natural. Among his best works are the frescoes in the Sassetti Chapel of the Trinity Church and in the choir of Santa Maria Novella at Florence, the pictures in the Uffizi and in the academy at Florence, the *Last Supper*, *Saint Jerome*, *Coronation of the Virgin* and *Adoration of the Kings*.

**Ghosts**, the name given to the spirits of the dead as seen or imagined by living persons. A belief in the return of the dead in the form of ghosts is common to almost all races from the very earliest times. It has always had an important part in religious beliefs and has led to the development of various religious theories, such as ancestor worship, belief in immortality, witchcraft, nature worship and totemism. The original source of belief in ghosts is difficult to trace, and various theories have been proposed

## Giants

concerning it. One group of scholars believes that the idea of the separation of the soul and the body was developed through the phenomena of dreams, in which, while the body is inactive, the mind or the soul apparently leaves the body and experiences strange sensations, even conversing with the dead. Ghosts assumed by course of development a terrible character. Being unlimited by the natural laws of the physical universe, they were able, it was thought, to pass instantly between places far removed from each other and to appear in a host of different forms. These beliefs led to the idea that ghosts possessed a remarkable superhuman power, and the greatest care was therefore exercised to secure the good will of departed spirits and to prevent them from exercising a malignant influence upon the living. Special fear was felt for the spirit of one who died a violent death or had been concerned with murder. This feeling still survives to a certain extent, as shown by the tales of haunted houses.

**Giants**, *gi'ants*, people of extraordinary stature. History, both sacred and profane, makes mention of giants, and even of races of giants, but these tales are usually found only in the



GIANT IN BATTLE WITH ARTEMIS  
From a relief in the Vatican, Rome.

records of an early stage of civilization, when the mind is apt to exaggerate anything unusual. The average height of men is about five feet five inches; but it may be said that each race has an average height of its own, which changes little from generation to generation and which often varies considerably from the general average of all men. Thus, the difference between the extremes, the Scotch (sixty-nine and five-tenths inches) and the Batwas of Africa (fifty-one inches) is over eighteen inches. Notable

## Giants' Causeway

deviations from the medium height are not at all uncommon, especially among the Teutonic peoples. The following are among authentic instances, ancient and modern, of persons who attained to the stature of giants: the Roman emperor Maximinus, a Thracian, nearly nine feet in height; Patrick Cotter (1761–1804), ninety-nine inches; Anna Swan, a native of Nova Scotia, above eight feet high; her husband, Captain Bates, a native of Kentucky, of the same height; Chang-wu-gon, the Chinese giant, seven feet nine inches high. Probably the tallest man whose size is definitely recorded is a certain Finlander who reached the height of nine feet four inches. As a rule giants are comparatively feeble in body and mind, and they are usually short-lived. Gigantic stature is generally accompanied by a want of proportion in parts, some parts growing too quickly for others or continuing to grow after the others have ceased. The relation between the upper and lower half of the body is not disturbed, but the skull, brain and forehead are relatively small, the jaws very large, the shoulders, breast and haunches very broad and the muscular system comparatively weak.

The giants of Greek and Norse mythology were, of course, merely symbols, representing benignant or hostile forces of nature. Sometimes by the Greeks the term giant was applied to a man of great strength, even if he was not of gigantic size.

**Giants' Causeway**, *kawz'way*, a remarkable promontory, projecting from the north coast of Antrim, Ireland. It is formed by a mass of basalt from 300 to 500 feet in thickness. The causeway extends for about 300 yards and is formed of the tops of about 40,000 closely fitting basaltic columns, which have the form of six-sided prisms. The diameter of the columns varies from 15 to 20 inches, and each is divided into sections of nearly equal length. The entire structure is divided into three causeways, known as the Little Causeway, the Middle Causeway, or Honeycomb, and the Grand Causeway. The Little Causeway has a variety of pillars, some being hexagons, others octagons and still others pentagons. In the Middle Causeway an arrangement of columns forms a chair, known as the Wishing Chair, and the Grand Causeway contains a structure known as the Lady's Fan, from its resemblance to this article. Another arrangement of columns forms the Giants' Loom, and still another, the Giants' Well. The promontory takes its name from an



## Gibbon

ancient legend which attributed its construction to giants, who commenced to build a road across the channel to Scotland.

**Gibbon**, a name commonly applied to the tailless monkeys which inhabit the islands of



GIBBON

the Indian Archipelago. The gibbon is distinguished by the slenderness of its form and by the extraordinary length of its arms, which, when the animal is standing, reach nearly to its ankles and which enable it to swing itself from tree to tree with wonderful agility. Its color is black, but its face is surrounded with a white or gray beard. Among the species are the common gibbon, or lar, the white-handed gibbon, the wow-wow and the hoolock. See APE.

**Gibbon, EDWARD** (1737–1794), an eminent English historian, born at Putney in Surrey. He entered Magdalen College, Oxford, but remained there only fourteen months. His studies resulted in his conversion to Roman Catholicism, and his father placed him under the care of a Calvinistic minister at Lausanne, by whom he was reconverted to the Protestant faith. During his years at Lausanne he studied diligently, and in 1758, after his return to England, appeared his first publication, *An Essay upon the Study of Literature*. In 1763 he visited Paris and Lausanne and in the following year traveled in Italy. It was here that the idea occurred to him, as he visited the ruins of the Capitol, of writing his great history, *The Decline*

## Gibbons

*and Fall of the Roman Empire*. In 1774 he obtained a seat in Parliament and was a silent supporter of the North administration and its American policy for eight years. The first volume of his great history was published in 1776, and his reputation was established at once. A complete edition of the history was published in 1783. Gibbon's history shows not only the remarkable breadth of his knowledge and attainments, but a great power of organization. As an authority on the period from the reign of Trajan to the fall of Constantinople, Gibbon's work is still unassailed, although in his skeptical attitude toward Christianity he has not given due prominence to the work accomplished by its spread.

**Gibbon, JOHN** (1827–1896), an American soldier, born in Pennsylvania. In 1847 he graduated at West Point. He was for a time instructor there, and in 1861 he entered the Union army. He took part in the second Battle of Bull Run and in the battles of Antietam, Fredericksburg and Gettysburg and was twice wounded. In 1864 he was made major general of volunteers and in the following year brigadier general and then major general in the regular army.

**Gibbons, JAMES** (1834– ), an American Roman Catholic cardinal, born in Baltimore,



CARDINAL GIBBONS

and educated in Ireland. His education for the priesthood was obtained in Saint Charles College and in Saint Mary's Seminary in Maryland, where in 1861 he was ordained priest. He



## Gibeon

served as priest of Saint Patrick's Church, Baltimore, and in Saint Bridget's Church, Canton, near Baltimore. After acting as secretary to Archbishop Spalding, he was made chancellor of the archdiocese and later assistant chancellor of the plenary council which met in Baltimore. In 1868 he was made bishop of North Carolina and four years later of the see of Richmond. On the death of Archbishop Bailey, whose coadjutor he had been, Gibbons became head of the see of Baltimore, and thus he became the head of the Roman Catholic Church in North America. In 1886 Gibbons was created a cardinal by Leo XIII. He has written *The Faith of Our Fathers, Our Christian Heritage* and *The Ambassador of Christ*.

**Gib'eon**, one of the ancient cities of Palestine, first inhabited by the Hivites, who, at an early stage of Joshua's conquests, by disguising themselves in old clothes and professing to come from a far country, obtained an alliance and covenant with the Israelites. It was during a battle fought at Gibeon against the kings of the Amorites, that Joshua commanded the sun to stand still and the moon to stay, until the people had taken vengeance on their enemies (*Josh. x, 12-14*). The city was also connected with the history of David and Solomon. Gibeon has been identified with the modern El-Jib.

**Gibraltar**, *jib rawl'tur*, a town and strongly fortified rocky peninsula near the southern extremity of Spain, belonging to Great Britain. It is connected with the mainland by a low sandy isthmus,  $1\frac{1}{2}$  miles long and  $\frac{3}{4}$  of a mile broad, known as the "neutral ground," and it has Gibraltar Bay on the west and the open sea on the east and south. The highest point of the rock, which is of gray marble, is about 1400 feet above sea level; its north face is almost perpendicular, while its east side exhibits tremendous precipices. On its south side it is almost inaccessible, making approach from seaward impossible; the west side, although very rugged and precipitous, slopes toward the sea; and here the rock is protected by powerful batteries, rendering it apparently impregnable. Numerous caverns and galleries, extending 2 to 3 miles in length and of sufficient width for carriages, have been cut in the solid rock, with portholes at intervals of every 12 yards, bearing upon the neutral ground and the bay and mounted with more than 1000 guns of the largest size and finest pattern. The garrison numbers about 5000.

The town of Gibraltar is situated on the west side of the peninsula, terminating in Europa

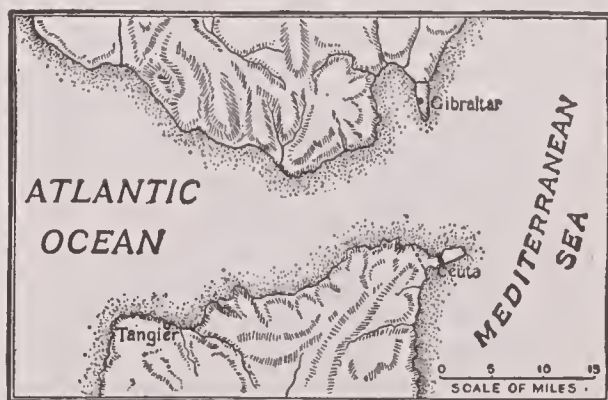
## Gibson

Point, and thus it fronts the bay. It consists chiefly of one spacious street, about a mile in length. The principal buildings are the governor's and lieutenant governor's houses, the admiralty building, a naval hospital, a victualing station, the barracks and a handsome theater.

Gibraltar is a free port and has a considerable shipping trade, being an entrepôt for the distribution of British manufactures. The chief export is wine. The administration is vested in the governor, who is also commander in chief of the troops. The civil population amounted to 19,120 in 1911, besides about 5000 soldiers.

Gibraltar, known to the Greeks as Calpe, was one of the famous "pillars of Hercules" (See HERCULES, PILLARS OF). It was first fortified as a strategic point by the Saracen leader, Tarik ibn Ziyad, in 711, from whom it was thenceforward called the "Rock of Tarik." It was ultimately captured by the Spaniards from the Moors in 1462, fortified in the European style and much strengthened. It was taken, however, in 1704 by a combined English and Dutch force, and was secured to Britain by the Peace of Utrecht in 1713. In 1779 a siege was begun by Spanish and French forces; it lasted till 1783, but failed.

**Gibraltar**, STRAIT OF, the channel which forms an entrance from the Atlantic into the Mediterranean. The narrowest part is a little to the west of Gibraltar, and is 15 miles wide.



A strong and constant current flows into the Mediterranean from the Atlantic Ocean, in the middle of the strait, but the under current, as well as two feeble lateral currents along the coast, set toward the ocean.

**Gibson**, CHARLES DANA (1867- ), an American illustrator, born at Roxbury, Mass. He studied at the Art Students' League in New York and in 1886 began to draw for periodicals. He studied in Paris and also in London and Munich. His popular works are cartoons of



## Gibson

society. He created the type of feminine beauty known as the "Gibson girl." Among his published works are the *Education of Mr. Pipp*, *A Widow and Her Friends*, *The Social Ladder*, *London as Seen by C. D. Gibson* and *People of Dickens*.

**Gibson, JOHN** (1790–1866), one of the most distinguished English sculptors of modern times, born near Conway, in Wales. He attracted attention by a figure of *Time*, modeled in wax, which he exhibited at the age of eighteen. The patronage of William Roscoe assisted him to go to Rome, where he was cordially received by Canova and where he spent the rest of his life. On the death of Canova in 1822 Gibson entered the studio of Thorwaldsen and showed in all his works the influence of both these great sculptors. In 1836 he was made a member of the Royal Academy. Most of Gibson's subjects are taken from classical mythology and are executed with a noble severity and purity of style. Among his best works are *Venus with the Turtle*, considered by many his best work; *The Wounded Amazon*; *The Hunter and His Dog*; *Hylas and the Nymphs*; *Helen*; *Proserpine*; *Sappho*, and the group *Queen Victoria Leading Justice and Clemency*.

**Gid'dings, JOSHUA REED** (1795–1864), an American politician and reformer, especially famous as one of the moderate Abolitionists in the antislavery struggle. He was born at Tioga Point, Pa., but was taken in childhood to New York and then to Ohio. He served for a few months in the War of 1812, afterward taught school and in 1821 began the practice of law at Jefferson. He was elected to the legislature and to Congress and there early entered the struggle for the abolition of slavery in the territories. He soon attracted the attention of the country by his resolutions declaring that the slaves who had arisen and escaped from Virginia were guilty of no crime, since they were naturally entitled to their liberty. He was censured, and he resigned, but was immediately reelected, and he remained in Congress until 1859. Giddings powerfully opposed the Compromise of 1850, the repeal of the Missouri Compromise in 1854 and the Kansas-Nebraska Bill.

**Gid'eon**, the son of Joash, of the tribe of Manasseh. He delivered the Israelites from the oppression of the Midianites (*Judges VI and VII*). He was afterward chosen judge of Israel.

**Gila, he'lah**, a North American river which rises in the Sierra Madre Mountains in New Mexico and flows westward for about 500 miles

## Gilbert

and then unites with the Colorado. Curious ruins of stone-built houses of a former age occur all along its banks.

**Gila Monster**, a name commonly given to a lizard found in the sandy deserts of New Mexico, Arizona and Texas. It is a repulsive animal, usually about a foot in length and often larger, with a fat tail and short, weak legs. Its scales are brilliant orange and jet black. It is closely allied to the heloderm, and, like the Mexican species, it is poisonous. It has grooved teeth and highly developed salivary glands at their bases. The bite of the gila monster is rapidly fatal to small mammals and birds and very injurious, though seldom fatal, to man. The heloderms are the only lizards known to be venomous.

**Gilbert, HUMPHREY, Sir** (1539–1583), an English navigator and explorer. He was a man of liberal education and attained distinction in the English army during several campaigns. He became interested in the search for a route to India and in 1578 received a commission from Queen Elizabeth to conduct an expedition. His first adventure met with mishap, but after a few years a second expedition, in which both Raleigh and Gilbert were interested and which was under Gilbert's personal command, sailed for America. He planted a colony near Saint Johns, Newfoundland, but it proved a failure, and after a few weeks Gilbert set out for England. He encountered a storm and was never heard from again.

**Gilbert, JOHN, Sir** (1817–1897), an English painter and engraver. His industry was wonderful and he produced an almost incredible number of works. In 1871 he was knighted. His first notable work was *The Arrest of Lord Hastings by the Protector Richard, Duke of Gloucester*, in water color. He also painted in oil, and among his more notable productions in that branch of the art are *Don Quixote Giving Advice to Sancho Panza*, *The Education of Gil Blas* and a series of tableaux of the principal characters in Shakespeare.

**Gilbert, WILLIAM SCHWENK** (1836–1911), an English dramatist, born in London. He studied at London University, became a clerk in the education office and in 1862 was called to the bar. His time was devoted, however, almost entirely to literature. After producing several plays which had a moderate success, he entered into partnership with Arthur Sullivan, the composer, and in conjunction with him produced a series of comic operas. *H. M. S. Pinafore*, *The*

## Gilbert Islands

*Pirates of Penzance*, *The Mikado* and other similar operas had a most remarkable popularity.

**Gilbert Islands** or **Kings'mill Group**, a group of sixteen islands in the Pacific Ocean, on the equator. They are of coral formation, and all are low and not fertile. Their chief products are cocoanuts, pandanus, taro and the bread-fruit tree. These islands were annexed by Great Britain in 1892.

**Gilder**, RICHARD WATSON (1844-1909), an American editor and poet, born in Bordentown, N. J. He was given a secondary education in his father's seminary at Flushing, Long Island, and studied law in Philadelphia. In an emergency campaign in Pennsylvania during the Civil War, he served as a private. He helped to establish the *Newark Register* and was afterwards editor of *Hours at Home*. When this publication was merged into *Scribner's Monthly*, he became the assistant editor; and when this magazine was in turn changed to the *Century*, he succeeded J. G. Holland as editor in chief. Mr. Gilder from the first took an active interest in matters of public welfare and became a member of several reform organizations. He wrote a number of poems for the magazines, and some of the best have been collected in *Five Books of Song*, *In Palestine* and *Poems and Inscriptions*.

**Gilding**, the art of covering a surface of metal, wood or paper with a fine layer of gold. It was practiced by the ancients, the Egyptians, Persians, Greeks and Romans having shown great skill in it. The ancient mechanical process, the best for many kinds of work, consists in applying a fine gold leaf to a surface which has been treated with a size, which, when partly dry, enables the gold to adhere. Japanner's gilding is performed by covering the surface with a gold dust or powder, instead of gold leaf. The frames of pictures and mirrors, moldings and other articles are gilded by the application of gold leaf, or by the inferior process of German gilding, that is, by tin foil or silver leaf with a yellow varnish above. Books are gilded by covering the edges with some substance to which the gold leaf will stick, and polishing the surface when dry. Metals are often gilded by means of an amalgam of gold and mercury, the mercury being driven off by means of heat after the application. The surface is then varnished. In the gilding of iron and steel, gold leaf is sometimes applied after the surface has been well cleaned and heated until it turns a bluish color. The process used in pottery, glass and china consists of applying the gold like paint, after which the articles are baked in an

## Gills

oven of rather low temperature. After cooling, the gold is burnished. There are innumerable special processes for the gilding of particular kinds of ware.

**Gilead**, that portion of country extending from the Jordan eastward to the desert lands forming a portion of Arabia and included between Arnon on the south and Yarmuk on the north, though the boundaries are not very definitely determined. Most of the country is fertile, well watered and has a luxuriant vegetation. This is the land given the tribes of Gad, Reuben and a part of the tribe of Manasseh, when the Israelites took possession of the Promised Land (See *Numbers* XXI, 21). During all the history of the Israelites, Gilead was a sort of land of asylum, to which those who were not in harmony with the government could flee. It was the refuge for Absalom when he fled from his father, and during Absalom's rebellion it served David for a similar purpose. It was the home of Elijah and Saul, and Saul with his sons was buried there. See PALESTINE.

**Giles**, *jilez*, WILLIAM BRANCH (1762-1830), an American politician, born in Amelia County, Va., educated at Hampton-Sidney and Princeton colleges. He practiced law at Petersburg, Va., and was elected to Congress in 1791 as a Republican, though he had earlier held Federalist views. He became a leader of the most radical Republicans, attacked Washington's administration with great vigor, opposed the establishment of a national bank, opposed the Jay treaty, supported the Virginia Resolutions and made bitter charges against prominent Federalist officials. Elected to the Senate in 1804, he became a leader of the Republicans in that body. During the War of 1812, however, and in the years preceding, he opposed Madison's administration and constantly hampered the government in its management of the war. He retired from the Senate in 1815, almost discredited as a party leader.

**Gill**, CHARLES IGNACE (1844-1901), a distinguished Canadian jurist, born at Pierreville, Quebec. He was a member of the legislative assembly of the province (1871-1874) and of the Canadian House of Commons (1874-1879). In May, 1879, he was raised to the bench and was chosen to a position in the Dominion supreme court.

**Gills**, the breathing organs of animals which obtain their oxygen from water. In fishes, the gills consist of cartilaginous or bony arches, attached to the bones of the head and furnished on the outer, convex sides with a multitude of



## Gilman

fleshy leaves, of fringed, vascular fibers, resembling plumes, which are, when healthy, of a red color. The water is admitted by gill-openings, and as it circulates through the plume-like parts of the gills, the oxygen is extracted from it. The crustaceans, the mollusks and the amphibians in certain portions of their lives are furnished with gills.

**Gilman**, DANIEL COIT (1831-1908), a distinguished American educator, born at Norwich, Conn. He graduated from Yale University and was made professor of physical and political geography in that institution. He held the position until 1872, when he became president of the University of California. From 1875 until 1901 he served as president of Johns Hopkins University. On the establishment of the Carnegie Institution in the latter year Dr. Gilman was elected president, but he resigned his position after two years. Several of the most prominent universities have conferred degrees upon him. He was president of the American Oriental Society and a member of the British Association and of several other similar organizations of high rank.

**Gilmore**, PATRICK SARSFIELD (1829-1892), an American bandmaster, born near Dublin, Ireland. He went with an English band to Canada in 1847 and soon moved to the United States, becoming conductor of a military band at Salem, Mass. In 1859 he organized the famous Gilmore's Band at Boston, but during the Civil War served in the Union army as bandmaster. There he distinguished himself as a director of a great musical festival at New Orleans, in which many regimental bands participated. After the war, at the National Peace Jubilee in 1869 and the World's Peace Jubilee in 1872, he greatly extended his reputation, at one time conducting an orchestra of one thousand pieces and a chorus of twenty thousand voices. Soon afterward he began a concert tour through America, Canada, Great Britain and Continental Europe, by which he gained universal fame.

**Gilolo**, *je lo'lo*, **Jilolo** or **Hal'mahe'ra**, an island in the Indian Archipelago, the largest of the Moluccas. The area is estimated at 6300 square miles. It is of singular form, consisting of four peninsulas radiating north, east and south from a common center. The principal productions are sago, cocoanuts, spices, fruits, edible birds' nests and useful timber. Horses, cattle and sheep abound. The chief towns are Galela and Potani. The island is under the

## Ginseng

control of the Netherlands. Population, about 120,000.

**Gilt'head**, a fish of the seabream family, common in the Mediterranean. It has strong grinding teeth, for crushing the shells of mollusks, on which it feeds. Its general color is a mixture of silver and sky-blue, its dorsal and caudal fins are black, while its sides are marked with golden bands, and between its eyes is a crescent-shaped yellow spot. It is a fine fish and sometimes reaches a weight of twenty pounds.

**Gin**, *jin*, a spirit which is distilled from grain and which is usually flavored with juniper berries, though sometimes with oil of turpentine and common salt and other substances. It is largely manufactured in Holland.

**Ginger**, *jin'jur*, a plant that grows in moist places in various parts of tropical Asia and the Asiatic islands and which has been introduced into the West Indies, South America and West Africa. It is a reed-like plant with white, purple-streaked flowers and knotty rootstocks. From these rootstocks is obtained the ginger of commerce. Besides having medicinal properties, ginger is a favorite condiment and confection.

**Gingham**, *ging'am*, a cotton fabric, differing from calico in having the colors woven with the fabric, not printed on it. The patterns are various—sometimes fancy designs, sometimes checkered and sometimes striped. Ginghams were first made in India, but now they are extensively manufactured in the United States.

**Ginkgo**, *jin'go*, a plant cultivated for ornamental purposes in all civilized countries. It is a native of China and Japan, where it was considered as a sacred tree, but it was not until recently known in the wild state. It has wide, flat leaves on thin stems, and from the resemblance to the leaves of the maidenhair fern the ginkgo has often been called the maidenhair tree. It is found in the United States as far north as Massachusetts, and it is highly prized as an ornamental tree.

**Ginseng**, *jin'seng*, the root of a low plant, different species of which are natives of the United States and of China and which belong to the same family as the wild sarsaparilla. The Chinese prize ginseng highly, attribute to it superhuman virtues and consider it a remedy for nearly all diseases. Some of the roots, which resemble the human body in shape, command almost unlimited prices from the superstitious Chinese. Wherever found in the United States, ginseng is collected and becomes a valuable article of export. The result of this has been to

## Giordano

encourage its cultivation, and in many localities there are successful gardens of it; but as it takes about five years to mature a crop, the industry does not spread very rapidly.

**Giordano**, *jor dah'no*, LUCA (1632-1705), an Italian painter, born at Naples. In 1679 he was employed by Charles II to ornament the Escorial, and at the court of Spain he became a great favorite. On his return to Naples, after the death of Charles II, he executed a great number of pictures with remarkable rapidity. His most celebrated pieces are frescoes in the Escorial at Madrid, and others at Florence and Rome. Some of his finest paintings are at Dresden.

**Giorgione**, *jor jo'na*, (1477-1511), whose real name was Giorgio Barbarelli, was one of the most celebrated painters of the Venetian school. In Venice he ornamented the façades of several large buildings with frescoes, which have mostly perished. His portraits are reckoned among the finest of the Italian school. His pieces are rare, but some are to be seen at Milan and in the galleries at Vienna and Dresden. Among the works ascribed to him are *Moses and the Burning Bush*, *The Judgment of Solomon*, *Christ Bearing the Cross*, *Apollo and Daphne* and *Three Ages of Man*.

**Giotto**, *jot'to*, or **Ambrogio di Bondoni** (1266-1337), a celebrated Italian painter. He was born at the Florentine village of Vespignano. It is said that while a shepherd boy he was seen drawing sheep on a slate by Cimabue, who took him for a pupil. His natural talent developed so rapidly that he soon surpassed all his contemporaries. His figures have more life and freedom than those of Cimabue, as he particularly avoided the stiff style. Among his most celebrated pieces are the *Navicella* (ship) at Rome, frescoes representing the lives of Saint John the Evangelist and John the Baptist, found in the Cathedral of Santa Croce, Florence; also the history of Saint Francis, at Assisi, and several miniatures. He was also successful as a sculptor and architect. The Bell Tower of the Cathedral at Florence, commonly called Giotto's Tower, was Giotto's masterpiece, and though unfinished at the time of his death it is noted for its color and its profuse ornamentation.

**Gipsy**, *jip'sy*. See GYPSIES.

**Giraffe**, *ji raf'*, or **Camelopard**, a remarkable animal inhabiting Africa, the only species of its genus and family. It is the tallest of all animals, a full-grown male reaching the height of eighteen to twenty feet. This great stature

## Girard

is mainly due to the extraordinary length of the neck, in which, however, there are but seven vertebrae. It has on its head two bony projections, resembling horns. Its great height makes

it easy for it to feed on the leaves of trees, and in this it is further aided by its tongue, which is long and can be thrust far out of its mouth and curled about the twigs and leaves. When it browses on grass, it stretches out its fore legs as wide as possible, till it can reach the ground by means of its long neck. Its color is usually light fawn, marked with darker spots. It is a mild and inoffensive animal, and in captivity it is very gentle and playful. The giraffe



GIRAFFE

was a native of a great part of Africa, but has been driven out of many regions by reckless hunters.

**Girard**, *je rahrd'*, STEPHEN (1750-1831), an American philanthropist and banker, born at Bordeaux, France. When but thirteen years old he became a sailor, and in 1773 he was already master and captain of a vessel operating between New York, New Orleans and the West Indies. In 1777 he began his mercantile career in Philadelphia. From 1780 to 1790 he was in the West India trade, in partnership with his brother John. When the yellow fever broke out in Philadelphia, he devoted his fortune to the care of the sick and the burial of the dead, and throughout his life he materially aided worthy charities. He was heavily interested in the first United States Bank, and upon the lapse of its charter he bought most of its stock and its building and instituted the Girard bank. During the War of 1812 he placed its resources at the disposal of the government. He was also a large stockholder in the second United States Bank. At his death his immense fortune was left to charitable and municipal institutions of Philadelphia and New Orleans. Girard provided in his will for the establishment of Girard College. See GIRARD COLLEGE.



## Girard College

**Girard College**, a college established in Philadelphia, in 1848, under provisions made in the will of Stephen Girard. It was originally instituted for the education of poor white orphan boys. The faculty contains about seventy instructors and professors, and there are about 1750 students. The library contains 17,000 volumes; the endowment funds amount to nearly 16,000,000, and the property valuation of the institution is about the same. A peculiar provision of the will prevents any ecclesiastical, missionary or minister from having connection with the college, and clergymen are not even allowed to enter the grounds.

**Girder**, a main beam, either of wood or iron, resting upon a wall or pier at each end, employed for supporting a superstructure or a weight, as a floor, the upper wall of a house when the lower part is sustained by pillars, or the roadway of a bridge. Wooden girders are sometimes cut in two longitudinally, an iron plate is inserted between the pieces and the whole is bolted together; such a girder is called a *sandwich girder*. For bridges, cast-iron girders are sometimes used, in lengths of 40 feet and upward, but when the span to be crossed is much greater than 40 feet, recourse is had to wrought iron, or to *trussed*, *lattice* or *box girders*, and cast iron is now little used. A *trussed girder* is a wooden girder strengthened with iron. A *lattice girder* is a girder consisting of two horizontal beams, united by diagonal crossing bars, somewhat resembling wooden lattice work. A *box girder* is a kind of girder resembling a large box, such as those employed in tubular bridges. Another style is the *bowstring girder*, which is a variety of the lattice girder; it consists of an arched beam, a horizontal tie resisting tension and holding together the ends of the arched rib, a series of vertical suspending bars, by which the platform is hung from the arched rib, and a series of diagonal braces between the suspending bars.

**Girondists**, *zhe roN'dists* (from *Gironde*, a department of France), one of the great political parties of the French Revolution. The Girondists were moderate republicans, but were distinguished for visionary ideals, rather than for a well-defined policy; hence, they fell an easy prey to the more radical Jacobins. Their overthrow was accomplished in June, 1793.

**Glacial**, *gla'shal*, **Pe'riod** or **Age of Ice**, the division of geologic time embracing the first part of the Quaternary period and taking its name from the peculiar climatic conditions

## Glacier National Park

that prevailed on the northern hemisphere. During the Glacial period many parts of the old and the new world were subjected to intense cold and covered with a sheet of ice, which is supposed in many places to have been several thousand feet in thickness. In the United States this ice sheet covered the whole of New England, New York, northern New Jersey, Pennsylvania and Central Ohio and extended westward beyond the Mississippi into Minnesota. It is not known whether this vast region was covered by one sheet of ice or by several which in time flowed together. Nearly all of Canada east of the Rocky Mountains was also covered in a similar manner, and in Europe the British Isles and all of the Continent north of the forty-ninth parallel were covered with ice.

In the course of time the glacier began to move towards its lowest point. In the eastern part of the United States its general direction was to the southeast, while in the central portion it was to the southeast and southwest, showing a division in the ice sheet. In Canada the direction seems to have been toward the northeast. Wherever it existed the straight mass of ice in its movement leveled hills and mountains, filled up valleys and lake beds in some places and hollowed them out in others. The rocks over which it passed were worn smooth and were scratched by the movement of the boulders which were frozen into the glacier. The scratches thus made are known as *striae*. Some of these are large furrows, while others are mere scratches on the rock. The glacier carried with it large quantities of rock and other debris, which were deposited wherever it melted. This accounts for many of the boulders in the Mississippi valley and in the eastern portion of the United States, which are of an entirely different character from the rock of the surrounding region. See ERRATICS.

The cause of the Glacial period is not well understood, and various theories have been advanced to account for it. Among these are that the sudden elevation of the northern continents caused such a change in temperature as to cover the region with the ice; another is that the change in atmospheric and oceanic currents caused such a heavy rainfall over the cold portions of these continents as to form the glacier, and a still later theory is that the change in climate was due to a change in the relative positions of the earth and sun. See DRIFT; GLACIERS; MORaine; QUATERNARY PERIOD.

**Glacier National Park**, a government res-







SELKIRK GLACIER  
In the Rocky Mountains, British Columbia

ervation, created a national park in February, 1910. It is in northwestern Montana, 447 miles by rail from Yellowstone Park, and has an area of about 1500 square miles. As the name implies, the most striking feature of the park is its glaciers, of which there are between seventy and eighty, the largest nearly five square miles in extent. Other scenic beauties are plentiful, also, for there are steep cliffs, dashing mountain streams, dozens of waterfalls, and over 250 lakes, surrounded by wooded mountains or rocky walls. The streams, the lakes, and Flat-head River, which borders the park on the west, abound in fish, and the wooded sections contain many wild animals. Numerous trips, of from one day to thirty, have been mapped out, and the park is becoming a favorite resort of tourists during the open season, from June 15 to October first.

**Glaciers**, *glä'shurz*, icy masses of great bulk, harder than snow, yet not exactly like common ice, which cover the summits and sides of mountains above the snow line. They are found in Switzerland, Scandinavia, the Andes and in the Rocky Mountains in British Columbia and Alaska. They extend down into the valleys often far below the snow line and bear a considerable resemblance to a frozen torrent. Glaciers have their origin in the higher valleys, where they are formed by the freezing and compression of masses of snow into a granular ice, called by the French *neve*. The ice of glaciers differs from that produced by the freezing of still water and is composed of thin layers filled with air bubbles. It is likewise more brittle and less transparent.

The glaciers are continually moving downward, and not infrequently they reach the borders of cultivation. A glacier moves from eighteen to twenty-four inches in twenty-four hours. At its lower end the glacier is generally very steep and inaccessible. In its middle course it resembles a frozen stream, with an undulating surface, broken up by fissures, or *crevasses*. As it descends, it experiences a gradual diminution, from the action of the sun and rain and from the heat of the earth, hence a phenomenon universally attendant on glaciers—the issue of a stream of ice-cold turbid water from the lower end. The descent of glaciers is shown by changes in the position of masses of rock at their sides and on their surface.

As glaciers move they pile up *moraines*, consisting of accumulations of stones and gravel, along their sides and at their lower ends. These

are composed of fragments of rock detached by the action of frost and other causes (See *MORaine*). The fissures or crevasses by which glaciers are traversed are sometimes more than 100 feet in depth, and since they are often covered with snow, they are exceedingly dangerous to travelers. One of the most famous glaciers of the Alps is the Mer de Glace, belonging to Mont Blanc, in the valley of Chamouni, about 5700 feet above the level of the sea. However, in the chain of Monte Rosa the phenomena of glaciers are exhibited in their greatest sublimity, as also in their most interesting phases from a scientific point of view. Glaciers exist in all zones in which mountains rise above the snow-line. Those of Norway are well known and also those of Iceland and Spitzbergen. Hooker and other travelers have given accounts of those of the Himalayas. Glaciers are conspicuous on the Andes, while the Southern Alps of New Zealand rival in this respect the Alpine regions of Switzerland.

The glaciers of Alaska are noted for their size and grandeur. They reach their greatest development along Glacier Bay and around Mount Fairweather, where, excepting those of polar regions, the largest glaciers of the world are found. Compared with these the glaciers of the Alps are mere rivulets. Among the most noted are the Malispena, on Yakutat Bay, 1550 feet high, with an area of 600 square miles; the Valdez, in Prince William's Sound, fifteen miles long; the Muir, at the head of Glacier Bay, 200 feet high with a frontage three miles long and the Pacific Glacier, off Mount Fairweather. Extensive glaciers are also found around Cook's Inlet and along the Peninsula of Alaska. All of the valleys of the northern Alaskan coast are filled with ice rivers, and the fiords of this entire region have been formed by glacial action. In numerous instances the glaciers have plowed out gorges many feet below the level of the sea.

The problem of the descent of glaciers is of extraordinary interest, and various theories have been put forward to account for it. It was shown that a glacier moves very much like a river—the middle and upper parts faster than the sides and the bottom—and that glacier motion was like that of a mass of thick mortar or a quantity of pitch down an inclined trough. This theory is known as the *viscous theory* of glaciers, which presupposes that ice is a plastic body; and this plasticity has been satisfactorily explained by Prof. James Thomson, of Glasgow



## Glacier Tables

by the phenomenon of the melting and refreezing of ice. Water, he discovered, when subjected to pressure, freezes at a lower temperature than when the pressure is removed. Consequently, when ice is subjected to pressure it melts; if it is relieved of pressure the water again solidifies. Therefore if two pieces of ice are pressed together, they tend to relieve themselves by melting at their points of contact, and the water thus produced immediately solidifies on its escape. If ice is strained in any way it similarly relieves itself at the strained parts, and a similar regelation follows. This, when applied to the glaciers, gives a complete explanation of their plasticity. Pressed downward by the vast mass, the ice gradually yields. Melting and refreezing takes place at some parts; at others the gradual yielding at strained points goes on. In the latter process there is no visible melting, but there is the gradual yielding from point to point to the pressure above. If, however, at certain points the strain is intense, the ice becomes extremely brittle. The latter fact disposes of Tyndall's objection to Forbes's theory, which was based on the fact that *crevasses* proved the brittleness and not the viscosity of ice.

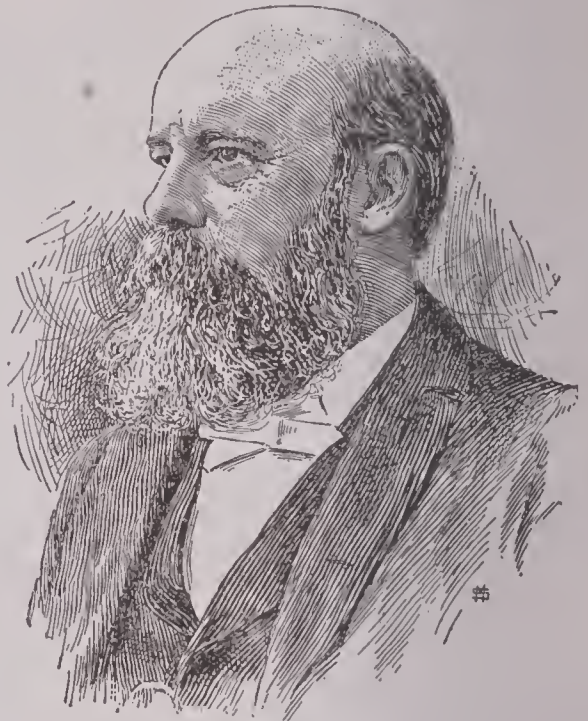
See GLACIAL PERIOD; MER DE GLACE; MUIR GLACIER. Consult Russell's *Glaciers of North America*, and Tyndall's *Glaciers of the Alps*.

**Glacier Tables**, large stones found on glaciers, supported on pedestals of ice. The stones attain this peculiar position through the melting away of the ice around them and through the depression of its general surface by the action of the sun and rain. The block, like an umbrella, protects the ice below it from both; and accordingly its elevation measures the level of the glacier at a former period. By and by the stone table becomes too heavy for the column of ice on which it rests, or its equilibrium becomes unstable, whereupon it topples over, and, falling on the surface of the glacier, it covers a new space of ice and begins to form another table. See GLACIERS.

**Gladden**, WASHINGTON (1836- ), an American clergyman and author, born in Potts Grove, Pa., and educated at Williams College. He began his career as a Congregational minister in 1860 and served as pastor of a number of leading churches in Brooklyn, N. Y., North Adams, Mass., and Springfield, Mass. In 1882 he became pastor of the First Congregational Church of Columbus, Ohio. From 1871 to

## Gladiators

1875 he was one of the editors of the *Independent* and was editor of the *Sunday Afternoon* from 1878 to 1880. His writings and pulpit utterances are known for their vigor, directness and practical suggestions and have exerted a wide influence not only within his own church but throughout the country. Mr. Gladden is the author of many works. Chief among these



WASHINGTON GLADDEN

are *Plain Thoughts on the Art of Living*, *Workingmen and Their Employers*, *Being a Christian*, *The Young Men and the Churches*, *Parish Problems*, *Burning Questions*, *Ruling Ideas of the Present Age* and *The Christian Pastor*. He has also written extensively for magazines.

**Gladiators**, combatants who fought at the public games in Rome for the entertainment of the spectators. The first instance known of gladiators being exhibited was in 264 B. C., by Marcus and Decimus Brutus at the funeral of their father. Gladiators were at first prisoners, slaves or condemned criminals; but afterward freemen fought in the arena, either for hire or from choice; and still later, men of senatorial rank, and even women, fought. The regular gladiators were instructed in schools, and the overseer purchased the gladiators and maintained them. Men of position sometimes kept gladiatorial schools of their own. The gladiators fought in the schools with wooden swords. In the public exhibitions, if a vanquished gladiator was not killed in the combat, his fate was decided by the people. If they



## Gladiolus

wished his death, perhaps because he had not shown sufficient skill or bravery, they held up their thumbs; the opposite motion was the signal to save him. The victor received a branch of palm or a garland and sometimes his freedom.

**Gladiolus**, a genus of plants of the iris family, containing about ninety species, natives of Europe and Africa, but especially numerous in South Africa. The gladioli are extensively grown in Europe and the United States, both indoors and out, because of the large, brilliant flowers, varying from white to rose and crimson in color. They are arranged in long, one-sided clusters, which are raised on a tall stem from among long, sword-shaped leaves.

**Gladstone**, WILLIAM EWART (1809–1898), a British statesman, born at Liverpool. He was educated at Eton and at Christ Church, Oxford, and left college in 1831. In 1832 the first Reform Act was passed, and Gladstone's public career commenced by his being returned

## Gladstone

this position the high financial ability for which he later became so famous. He took part with Peel in the repeal of the Corn Laws, a course which cost him his seat for Newark, but in 1847 he was returned for Oxford University. His ability as a financier grew, and it was in his attack on Disraeli's budget of 1852 that his first really great speech was made. In the following year he became chancellor of the exchequer under the earl of Aberdeen, a post which he also held for a short time in 1855 under Lord Palmerston. In 1859 he again took office as chancellor of the exchequer under Lord Palmerston. The budgets which he brought forward during the six years that followed were remarkable documents. At the general election of 1865 he was returned for South Lancashire, and in the same year he became the Liberal leader in the Commons in the Russell administration, still continuing to hold the chancellorship of the exchequer. In 1867 a Reform Bill was brought forward, to the final shape of which Gladstone materially contributed. His advocacy of this measure shows his definite break with the Conservative party and his transition to the Liberals.

At the general election of 1868 Gladstone lost his seat for South Lancashire, but was returned by Greenwich. There being a great Liberal



WILLIAM E. GLADSTONE



GLADIOLUS

for Newark. When Peel assumed office in 1834 Gladstone accepted the post of junior lord of the treasury, and in 1841 he became, under Peel, vice-president of the board of trade and master of the mint. Two years later he became president of the board of trade and showed in

majority in the new Parliament, Gladstone became premier. Next year he carried his bill for the disestablishment of the Irish Church, and in 1870 he passed his Irish Land Act. Parliament was dissolved in 1874, and the Conservatives succeeded to office. During Lord Beaconsfield's tenure of office, Gladstone de-



nounced the Bulgarian atrocities, the Anglo-Turkish treaty and the Afghan War, and his speeches during his candidature for Midlothian greatly helped to render the government unpopular. In 1880 the general election reinstated him firmly in power. In 1882 a Prevention of Crimes and an Arrears Act for Ireland were passed, and in 1883 measures relating to bankruptcy were carried. The bill extending household suffrage to the counties was next carried, but the Gladstone ministry fell the following year. In 1885 Salisbury resigned after an adverse vote in the Commons, and Gladstone again came into power. He soon startled the country by introducing a measure of home rule for Ireland (1886). It failed to pass the Commons, and an appeal was made to the country, the result of which was emphatically adverse to Gladstone's proposals. He had to make way for Lord Salisbury. In 1892, however, the result was again reversed, and Gladstone once more resumed authority. He introduced another Home Rule bill, which was passed by the House of Commons, but rejected by the House of Lords. After this Mr. Gladstone retired from public life. He wrote several books, among which are *Gleanings from Past Years* and *Studies on Homer and the Homeric Age*.

**Glanders**, a contagious disease afflicting horses, mules and asses and sometimes other domestic animals, though cattle, sheep and pigs are usually free from it. The disease is caused by a microbe and appears in different forms, though all animals afflicted with it usually present about the same characteristics. It is usually fatal, the animal dying in from eight days to three weeks. The chronic form, generally known as *farcy*, begins with the formation of little bunches or nodules under the skin, which terminate in ulcers. These ulcers occur usually on the neck and shoulders and inside the thighs. The disease affects the lungs and causes the nostrils to discharge a very offensive pus.

The spread of glanders is usually due to infection from the pus and other discharges of the afflicted animal. No remedy has been discovered, and when the disease appears the only means of preventing its spread is to kill the diseased animal and bury or burn the carcass, then thoroughly disinfect the stables and all articles that have come in contact with the animal. Men have been known to acquire the disease by working over animals afflicted with it, and the symptoms are similar to those in the horse.

**Glands**, organs whose specific function is to separate something from the blood (See SECRETION). In structure a gland is a body of secreting cells, a supporting basement membrane, a fine network of blood vessels, a nerve supply and a duct through which the secretion passes. *Simple tubular glands* are depressions of the mucous membrane, lined with secreting cells, as the glands of the stomach. Some bodies called glands have no duct, as the spleen and the thymus gland; the latter is situated in the front of the chest behind the sternum and partly in the lower part of the neck. It is largest in infants and gradually disappears in adult, or old, persons. It has been claimed that its function is the formation of colorless corpuscles. In hibernating animals it becomes enlarged and is laden with fat, as the time for the winter sleep approaches, and it may help to maintain the temperature and respiration of the body during the period of rest. The *thymus* of veal and lamb is called *neck sweetbread*, to distinguish it from the pancreas, or stomach sweetbread. The *thyroid gland* lies in the throat below the larynx and when enlarged by disease gives rise to "Derbyshire neck" (See GOITER). The *liver* is the largest gland of the body. In connection with the alimentary canal there are in the mouth, the two *parotid*, two *submaxillary*, two *sublingual* and many *buccal* glands, whose function is to secrete saliva. The parotids are situated one in front of each ear and are the seat of the disease known as *mumps*. *Sebaceous glands* are abundant in those parts of the surface of the body supplied with hair; they are also situated about the entrances to the body, the nose, mouth and ear. These glands are absent from the palms of the hand and soles of the feet, and pour out an oily secretion which keeps the hair and skin soft. *Sudoriferous*, or sweat, glands are situated in all parts of the surface of the body and are especially abundant in the palms of the hand and soles of the feet. See SKIN; LIVER; PANCREAS; SPLEEN.

**Glas'gow**, the largest city in Scotland and the second largest in Great Britain, is situated mainly in the County of Lanark, on both banks of the Clyde River. The southern portion is built on low-lying, level ground, the northern portion on a series of elevations of varying heights. The streets are in general wide and straight, and the houses are built almost wholly of freestone. As a whole, Glasgow is now excelled by few cities in the United Kingdom in architectural beauty and attractiveness of appear-

## Glasgow

ance. Of the older buildings the cathedral, situated in the northeast of the city, is the most noteworthy. It is supposed to have been begun about 1240 and is a large Gothic edifice, with tower and spire rising from the center, and is especially noted for its beautiful crypt. The new university buildings, in the west end of the city, cover about 4 acres of ground on a splendid site, and their value is over \$2,000,000. Connected with the university is the Hunterian Museum of Anatomy and Natural History. The municipal buildings, in the center of the city, in George Square, form an imposing structure in the Renaissance style. Other noteworthy buildings are the Free Church College, the Royal Exchange, the Stock Exchange, the postoffice, the Saint Enoch Station and Central Station hotels, several clubhouses, banks and insurance offices. Most of the public monuments are collected in George Square, the finest square in the city. Glasgow has several public parks, the largest, the Green, containing 140 acres. The principal libraries are the University Library and the Mitchell Free Library. Among educational institutions, after the university, are Anderson's College Medical School, Saint Mungo's College, the Glasgow and West of Scotland Technical College and Saint Margaret's College for women.

The industries embrace cotton, linen, silk, woolen and jute, in all the processes of manufacture and printing; the making of steel, and machinery and metal goods of all descriptions; shipbuilding, over 400,000 tons of shipping having been launched in some single years on the Clyde; extensive chemical works, potteries, glass works, brick works, breweries, distilleries, tanneries, tobacco works and sugar refineries. The commerce is more than commensurate with the manufactures, the total number of vessels entering and leaving the harbor in 1910 being 11,000, with a tonnage of 7,000,000.

Glasgow has taken an especially advanced position upon the subject of municipal activities and owns and operates an exceptionally complete and perfect sewage disposal plant, lodging houses, tenements, public baths and wash rooms, lighting plants, waterworks, street cars, markets and slaughterhouses and ferries. The city is successful in all these lines and gains a net profit on the investments.

The city was founded about 560 and was erected into a royal burgh in 1180. Glasgow is represented in Parliament by seven members. Local government is in the hands of a lord provost.

## Glass

ten bailies and a council of 48 members. Population in 1901, 760,423; in 1911, with changed boundaries, 784,496.

**Glasgow**, UNIVERSITY OF, one of the most celebrated universities of Great Britain, founded at Glasgow in 1451. By acts of Parliament in 1858 and 1889, the university was thoroughly reorganized and now exists on very much the same plan as the universities of Oxford and Cambridge. The corporation consists of a chancellor and rector, dean of faculties, principal, professors and students. The chancellor is chosen for life. The rector is chosen by the students every three years. The university maintains departments in the arts, science, medicine and surgery, theology and law. The enrollment is about 2300, including many who receive fellowships and scholarships. The library contains 210,000 volumes, and the university has connected with it a number of important museums and exhibits.

**Glass**, a hard, brittle substance made by melting together under intense heat, sand and either potash, soda, lime or oxide of lead. When the substances from which it is made are pure, glass is usually transparent.

**HISTORY.** Glass has been in use for so many centuries that we do not know when it was first manufactured. Tombs of the ancient Egyptians which were built more than 3000 years B. C. show glassblowers at work, and specimens of glass that were made more than 2000 B.C. have been found in other tombs of these ancient people. The Chinese and other peoples of the East also became very skilful in the manufacture of glass before the Christian era. Vases, pitchers and other ornamental vessels found among the ruins of the buried cities in Greece and in Asia Minor, show that the Greeks and other ancient peoples of this part of the world were well acquainted with the manufacture of glass. The earliest use of glass was for ornamental purposes, and all of the articles which have been discovered in the ruins of ancient cities are of colored glass. The use of glass for windows is of more recent origin. As far as known, it was first used for this purpose in England in the latter part of the seventh century, but its use was restricted to colored glass which appeared in cathedral windows.

The manufacture of glass was introduced into the United States at an early date, but it did not become successful until after the Revolutionary War. The leading countries in the manufacture of glass now are Austria-Hungary, England, France and the United States. In this country



the center of the industry is around Pittsburg, Pa., and in the natural gas and coal regions of Indiana, Illinois and some other states.

**KINDS OF GLASS.** Owing to the different substances used in its manufacture, the various proportions in which these may be combined, and the different methods of manufacture, there are many different varieties of glass.

*Colored Glass.* However strange it may seem to us, the glass made by the ancients was colored. Originally this coloring was probably due to the impurity of the materials used. Later it was discovered that different colors could be produced by mixing certain substances with those ordinarily used in the manufacture of glass, and all colored glass made at the present time is produced in this way, the oxides of metals being used for most of the colors. Chloride of silver and gold produce yellow; compounds of iron, copper and gold produce red; blue is produced by cobalt, and orange by peroxide of iron and chloride of silver, while the oxide of tin gives a white color. By mingling these coloring matters in various proportions, a great variety of tints can be produced.

*Ornamental Ware.* There are many methods of making ornamental glassware. Sometimes the glass is colored by dipping a transparent glass into colored glass when the latter is in a molten state. Figures worked into vases and other articles, as shown in Figs. 6, 7, 10 and 11 in the accompanying color plate, are usually made by working the colored glass into the glass forming the body of the object. This is usually done by placing the figures upon the outside of the vessel and then subjecting the glass to such heat as will partially fuse it. The figure then sinks into the body of the glass and blends with it. Other beautiful effects, such as are shown in Figs. 4 and 9, are produced by blending glasses of different colors, either in the manufacture of the article or in the material from which it is to be made. For the method of making colored glass windows, see article on STAINED GLASS.

*Crown Glass* is the English window glass and differs from that made in the United States by being blown into spheres, instead of cylinders. When these are flattened they make circular plates. Crown glass is considered by some persons to be of better quality than cylinder glass, but it is not so desirable for windows, because it is of uneven thickness. Bottles and most small articles are made by blowing the glass into molds (See BOTTLE). Bottles and fruit cans are also made by machinery.

*Pressed Glass.* Much of the table ware and

many other small articles are made by pressing the glass in molds. The mold is of iron or steel and contains any ornamental designs which the article is to take. A sufficient quantity of melted glass to make the article is dropped into the mold, and then a plunger, which forms the inside of the article, is forced down upon it. This presses the glass into every part of the mold and impresses upon it the desired design.

*Plate Glass.* Plate glass is made by casting on an iron table. The melted glass is poured onto the table, which has a steel rim rising above the surface to the height of the desired thickness of the glass. As the melted glass is poured, a heavy roller is passed over it, forming the plate. The peculiar softness and brilliancy of plate glass are due to the purity of the material used and the polishing which the glass receives.

*Flint Glass.* This is a variety in which potash and pure sand are used, making it particularly clear and transparent. It is used for the best articles of table ware and in the manufacture of small bottles, vases and other smaller articles.

*Cut Glass.* This is made by grinding the best quality of blown glass on wheels, over which flow streams of water and sand. This glass is prized for its brilliancy and is very expensive.

**MANUFACTURE.** Glass is made in factories especially constructed for the purpose. The most important part of the factory is the furnace. This may be circular, with a shelf running around next to the wall, or it may be rectangular, with the bottom sloping towards one end. In either case, the furnace is the base of a huge chimney. The fuel used is gas, and the furnace must be supplied with a strong draft, in order to insure the intense heat necessary to melt the materials. These are placed in pots, when circular furnaces are used, and the pots rest upon the shelf around the wall of the furnace. These pots are made of fire clay and are very carefully constructed. Each holds from 1500 to 2000 pounds of material. For the best quality of glass the pot is hooded and has an opening on the side of the hood, through which the material can be put in and the melted glass taken out. For cheaper varieties the pots are open at the top. In the tank furnace the material is thrown into the tank, where, as fast as it melts, it runs down the sloping bottom to the lower end of the tank, from which it is taken out, while the raw material is put in at the opposite end.

The kind and quality of glass depend upon the substances used. For a good quality, all of the raw material must be pure. Sand forms the basis of all varieties and is the most difficult substance



## ARTISTIC GLASSWARE

1, Modern Vases, London.  
 2, Phoenician Pitcher, ancient.  
 3, Goldglass Tumbler, eighteenth century.  
 4, Modern Vases, Berlin.

5, Ruby Pitcher.  
 6, Chinese Vase.  
 7, Mohammedan Lamp, Egypt, fourteenth century.

8, Spanish Glass.  
 9, Venetian Flask.  
 10, Persian Bowl.  
 11, Modern Vases, New York.





from which to separate the impurities. Animal and vegetable impurities are removed by burning, but mineral impurities cannot be separated. Iron is the most objectionable of these, since it discolors the glass and, except for the poorest qualities, makes the sand worthless. Most sand is obtained from banks, but that for the highest grade of glass is prepared by crushing pure quartz rock. The other materials determine the kind of glass. Lime makes a hard, brilliant glass, but too much of it makes the glass brittle. Potash makes a clear, transparent glass, while soda imparts the green tint usually seen in cheap bottles. Oxide of lead imparts a brilliant luster to glass and also makes it soft. Window glass is usually made of sand, lime and potash or soda, and plate glass of sand, soda and lime.

*Preparation of Material.* The ingredients are ground to a fine powder and thoroughly mixed in proper proportions, forming what is called the *batch*. To this a small quantity of broken glass, or *cullet*, is added to assist in melting. In pot furnaces it requires about twenty-four hours for the glass to melt and become clear. When this has been done the fire is lowered, and the glass is taken out and worked. In tank furnaces the material is constantly being added and the glass being withdrawn.

*Methods Used.* There are three general methods of shaping glass, blowing, pressing and casting. Bottles, window glass, vases and the most expensive tableware are blown. The glass blower uses only a few tools of the simplest patterns and depends almost entirely upon his skill to obtain the desired results. He gathers on the end of his blowpipe, which is a straight iron pipe about four feet long, a sufficient quantity of melted glass to make the article desired, then by blowing into this, rolling and swinging the pipe and using such tools as calipers and burnishers, he proceeds to fashion the object. In blowing window glass, the workmen stand upon a bridge over a trench, which is several feet deep, and they use larger and longer blowpipes than those used in making small articles. The workman gathers upon his blowpipe from twenty to twenty-five pounds of glass. By blowing into this and swinging his pipe, he causes this mass at first to take on a shape resembling a pear; then by holding his pipe upright and blowing into the glass and rotating the pipe, he changes the pear into the form of a cylinder. When the cylinder has been perfected its ends are cut off; it is then laid upon a table and scratched lengthwise with a diamond; it is then

cut in two on the side by laying a cold iron over the mark. The open cylinder is placed in the flattening furnace, where, as it softens, a workman flattens it by pressing it down upon a table with a piece of charred wood attached to a long handle. This makes a pane of glass about forty-five inches long and thirty-six inches wide.

**Glass Snake.** See BLINDWORM.

**Glas'tonbury**, a town and municipal borough in Somerset, England, situated 25 mi. s. w. of Bath, on a peninsula formed in the Brue River. Though it has some manufactures and a considerable trade, it is chiefly important as the scene of many interesting events of English history. It contains the remains of a beautiful abbey, which was founded in the sixth century and which once covered more than 60 acres. It is said that the first Christian church in England was erected at Glastonbury. Tradition states that it is the burial place of King Arthur and Queen Guinevere, and that it was here that Joseph, one of the early Christian apostles to England, planted his pilgrim's staff, which took root and produced the famous Glastonbury thorn, which, it is said, blossomed every Christmas day. In medieval history and modern history Glastonbury had less importance, though in the time of Henry VIII it was the scene of violent persecutions on the part of the English Church. Population in 1911, 4300.

**Glauber's**, *glow'burz*, **Salt**, sulphate of sodium, so called because of the importance attached to its chemical and medicinal properties by Glauber, its discoverer. It forms large colorless prisms, which turn to powder on exposure to the air. It is soluble in water, and when heated it melts in its water of crystallization. It is found in many localities, both dissolved in the water of mineral springs and of salt lakes and as a powder around them. The chief medicinal use of Glauber's salt is as a purgative, but it is only used by veterinarians.

**Glazing.** See POTTERY.

**Glen'coe**, a romantic Scottish valley in the County of Argyle, near the head of Loch Etive. It is bounded on both sides by almost perpendicular mountains more than 3000 feet high, and the scenery is wild and grand. The valley was the scene of a tragedy, known as the Massacre of Glencoe, in February, 1692. The Highlanders who had favored James II were promised a full pardon if they would submit to the rule of William and Mary. The surrender of the MacDonalds was delayed, and their enemies, taking advantage of an irregularity in the form of their



## Glendower

submission, secured a warrant from the king to destroy them. Accordingly, after enjoying their hospitality, one hundred twenty men, led by Captain Campbell, attacked the Macdonalds and slew about sixty men, women and children.

**Glendower**, *glen'door*, OWEN (1359?–1416?), a distinguished figure in Welsh history, the leader in the revolt against Henry IV of England. He had been a follower of Henry of Lancaster before his accession to the throne as Henry IV, but for personal reasons he turned against him later, and the Welsh, who had been devoted to Richard II, were very ready to follow his example. Having raised a considerable force, Glendower caused himself to be proclaimed prince of Wales in 1400. He defeated the king's troops and, retiring to the mountains, successfully resisted for a time all attempts to bring him to action. His fortunes waned after several years, and from 1416 nothing is heard of him.

**Glens Falls**, N. Y., a village in Warren co., 56 mi. n. of Troy, on the Hudson River and on the Delaware & Hudson railroad. The falls in the river supply power for the factories, the most important of which are lime and cement works, lumber mills and manufactories of paper, shirts, collars and other goods. The village has a public library, a hospital, a state armory, two academies and several parks. Glens Falls was settled in 1763. Population in 1910, 15,243.

**Glenwood**, IOWA, the county-seat of Mills co., twenty miles s. e. of Council Bluffs, on the Chicago, Burlington and Quincy railroad. It is in a fine corn, fruit-growing and live stock country. It is the seat of the state institution for feeble-minded children. Population in 1910, 4052.

**Globe**, a sphere (See SPHERE). In geography and astronomy, the term globe is applied specifically to an artificial sphere, made of metal, plaster, paper or pasteboard, on the surface of which is drawn a map, or representation of either the earth or the heavens, the former being called the *terrestrial globe*, and the latter, the *celestial globe*. In the terrestrial globe the wire on which it turns represents the earth's axis, the extremities of it representing the poles. On the surface of the globe, as on other maps, are marked parallels of latitude and meridians. When the meridians are drawn through every 15° of the equator they are sometimes called the *hour circles*, since each two meridians mark points differing by one hour in time.

**Glom'men**, the largest river in Norway. It issues from Lake Aursundsjo, about 2417 feet above the sea level, in the southeast of South

## Glove

Trondhjem, flows generally south and after a course of about 370 miles falls into the Skagerrak at Frederikstadt. It has several falls in its course which impede navigation.

**Gloucester**, *glos'tur*, a port and city, the capital of Gloucestershire, England, situated on the left bank of the Severn, 33 mi. n. e. of Bristol. The ancient Roman ground plan of the city is still seen in the four streets meeting at right angles in the center of the town, at what is called *the cross*. Remains of Roman walls are to be seen in many places. Among the buildings of interest are a deanery, the New Inn, the episcopal palace and the new guild hall. The nunnery, which existed as early as the seventh century, was supplanted by a monastery about 820, which was in turn followed by a great Benedictine Abbey. This abbey became the center for the cathedral, which was built from 1088 to 1498. Gloucester has engineering works, flour mills, iron foundries, shipbuilding yards and manufactures of chemicals, cutlery, agricultural implements and soap. The commerce is important. Population in 1911, 50,035.

**Gloucester**, MASS., a city of Essex co., 31 mi. n. e. of Boston, on the Boston & Maine railroad. There is an excellent harbor, and the fisheries, which are the largest in the United States, include cod, herring, haddock, halibut and mackerel. There are also shipbuilding yards, quarries of granite and manufactories of clothing, shoes and cigars. The first permanent settlement was made in 1633, and it was chartered as a town in 1642 and as a city in 1873. The importance of the town dates from the beginning of the eighteenth century. It was prominent during the Revolution and the War of 1812, numerous privateering vessels being equipped and sent out from here. Population in 1910, 24,398.

**Gloucester City**, N. J., a city in Camden co., on the Delaware River, opposite Philadelphia, and on the Atlantic City and the West Jersey & Seashore railroads. It has manufactories of gas burners, ginghams, calico, yarn, shoes and other articles. Population in 1910, 9462.

**Glove**, *gluv*, a covering for the hand or for the hand and wrist, with a separate sheath for each finger. Gloves are made of leather, fur, cloth, silk, linen thread, cotton and worsted. The chief leathers used in glove manufacture are buck, calfskin and sheepskin, for military gloves; lambskin, for most of the so-called kid gloves; true kid, for the best and finest gloves; dog, rat and kangaroo skins, for other grades. The

## Gloversville

leather in all cases undergoes a much lighter dressing than when used for boots and shoes. Leather gloves are usually cut out by means of dies and are sewed by a machine of peculiar construction. The best woolen, thread and silk gloves are made by cutting and sewing, but cheaper grades are made by knitting and weaving. France supplies the world with most of the finer and more expensive gloves, but the United States leads in the manufacture of men's gloves, and the center of the industry is in Fulton County, N. Y. About three million dozen pairs of leather gloves and mittens are made in the United States each year.

**Gloversville**, *gluv'urz vil*, N. Y., a city in Fulton co., 54 mi. n. w. of Albany, on the Fonda, Johnstown & Gloversville railroad. It is the most extensive glove manufacturing center in the world, producing, with its neighboring city of Johnstown, more than half the entire output of the United States. The place was settled at the beginning of the Revolution and was known as Stump City until 1832. It was chartered as a city in 1890. Population in 1910, 20,642.

**Glow'worm**. See **FIREFLY**.

**Gloxin'ia**, a genus of plants, distinguished by the nearly bell-shaped corolla, which is divided



GLOXINIA

into lobes which are usually more or less irregular. The leaves are soft and velvety. The species are natives of tropical America and are valued as among the greatest ornaments of our gardens, owing to their richly colored leaves and their ample, graceful, delicately tinted flowers.

## Glucose

**Gluck**, *glook*, CHRISTOPH WILLIBALD (1714-1787), a German musical composer, born in Bavaria. He had little musical education, but in 1740 he was employed to compose an opera for the court theater of Milan. It was a triumph, in spite of the innovations of style which the author introduced. Later he went to London and there, influenced by Handel's works, he began to develop a lyric genius which was destined to create a new order of musical composition. After producing many ordinary operas, he at last found a poet who sympathized with his ideas, and the result of their coöperation was *Orfeo ed Euridice*, performed publicly for the first time in 1762. In 1766 his second great opera, *Alceste*, was produced, which raised public feeling to the point of enthusiasm. The principles of the new school were that the opera should be a musical drama, not a concert in costume; that the music must voice fully the spirit of the text; that in accompaniments the instruments must be used to strengthen the expression of the vocal parts. The crucial point of his career was at the production of *Iphigenie en Aulide* in Paris in 1774, simultaneously with one of the same libretto by Piccinni, a master of the old school. The intensest excitement prevailed; all Paris took sides, but the victory was with Gluck. Gluck achieved his greatest work in *Iphigenie en Tauride*, which was produced in 1779.

**Glu'cose**, a syrup manufactured in the United States from the starch of corn. The corn is soaked for two or three days in water containing a small quantity of sulphurous acid, then ground into a coarse meal and treated with a mixture of starch and water. This causes the germs to float to the surface, while the heavier portion, containing the starch, settles. The germs are skimmed off and used in making corn oil. The starch is separated from other parts of the crushed corn by washing. Glucose is made from the starch by treating it with water and hydrochloric acid in steam-heated, closed vessels, called *converters*; sulphuric acid is used for some grades. The process requires from ten to thirty minutes, according to the grade of glucose required. When the liquid leaves the converter, the acid is removed by chalk or marble, if it is sulphuric, or by soda, if hydrochloric. The glucose is then filtered and boiled until the desired consistency is secured. Glucose is considered a healthful food and is used for canning fruits and in making jellies and confectionery. The manufacture of glucose has



## Glue

become an important industry in the United States, and the country now exports many million dollars' worth each year. See CORN, subhead *Uses*.

**Glue**, an animal cement, made from the parings of hoofs and from the hides, tails and bones of animals. The parts are first thoroughly cleaned by soaking them in lime water; then they are boiled in soft water for several hours, until the glue is extracted. The liquid is then drawn off and allowed to cool. As the glue becomes solid it is cut into cakes, which are cut by wires into thin sheets. These are again cut into pieces about four inches square, then thoroughly dried and packed for shipment. White glue is bleached, but common glue is of a dark brownish color. Fish glue is made from the heads, offal and scales of fish. Glue is used for sticking pieces of wood together; in making ink rollers for printing presses; in thin solutions, for sizing paper and cloth; in calico printing, and in kalsomining. See GELATIN.

**Gluten**, a tough, elastic substance of a grayish color, found in the flour of wheat and other grains. It contributes much to the nutritive quality of flour and gives tenacity to its paste. A similar substance is found in the juices of certain plants.

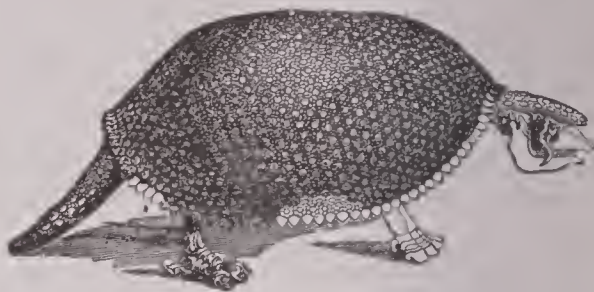
**Glutton**, a carnivorous animal, about the size of a large badger, belonging to the weasel family. It inhabits northern Europe and America and is known also by the name of *wolverene*, or *wolverine*. The glutton is slow but persevering, cunning, fierce and of great strength and is famous for its voracious appetite for putrid flesh. The fur, which is shaggy and dark brown, is valuable, that from Siberia being preferred because of its glossiness.

**Glycerine**, *glis'ur in*, a transparent, colorless liquid, obtained from the by-products of candle and soap factories, by the action of alkalies or of superheated steam. It is as thick as syrup, has a sweetish taste and at a low temperature crystallizes into a solid mass. It absorbs moisture from the air and dissolves in, or mixes with, water and alcohol in all proportions, but it is insoluble in ether. It acts as a solvent on both inorganic and organic bodies. The uses of glycerine are very numerous. In the arts it is used wherever a substance requires to be kept more or less moist. It is also used in the preparation of tobacco, and of paper for printing; in spinning, weaving, rope making and tanning. It is an excellent preservative medium for meat and for natural history specimens; and its property

## Gneiss

of lowering the freezing point of water makes it useful in gas meters, floating compasses and similar instruments. It is also extensively employed in the manufacture of nitroglycerine.

**Glyp'todon**, a huge animal, ten or twelve feet in length, known only from fossil remains found in South America, Mexico and Texas and



GLYPTODON

Florida. It was related to the armadillo and had a solid armor of bony plates, forming one piece, like the shell of a turtle. Its tail and head were also covered by plated mail.

**Gnaphalium**, *na fa'le um*, a widely-spread genus of composite plants, whose foliage is usually covered with a white, woolly down. Its flower-heads are of the "everlasting" variety.

**Gnat**, *nat*, a general term applied to a number of different insects, of which the most common is the mosquito. Some species are so minute as to be almost invisible, and as the stings they inflict are highly annoying and irritating and the insects appear sometimes in countless thousands, they render life almost intolerable in some localities. See MOSQUITO; HESSIAN FLY.

**Gneisenau**, *gni'ze now*, AUGUST, COUNT NEITHARD VON (1760-1831), a Prussian general. He served with the German auxiliaries of England in America, but his first important service was in the early campaigns against Napoleon. After the Peace of Tilsit he was made a member of the body appointed to reorganize Prussia, but Napoleon's hostility was so great that he was forced to resign. In the later campaigns against Napoleon he did good service, and as chief of Blücher's staff he directed in large part the strategy of the Prussian army at Waterloo. He was made field marshal in 1825.

**Gneiss**, *nise*, a rock, composed of quartz, feldspar and mica, arranged in layers. The layers, whether straight or curved, are frequently thick, but often they vary considerably in the same specimen. Gneiss passes on one side into granite, from which it differs in its foliated structure, and on the other into mica slate. It is rich in metallic ores, such as gold, silver, cobalt, antimony, copper and iron, but it contains no

## Gnostics

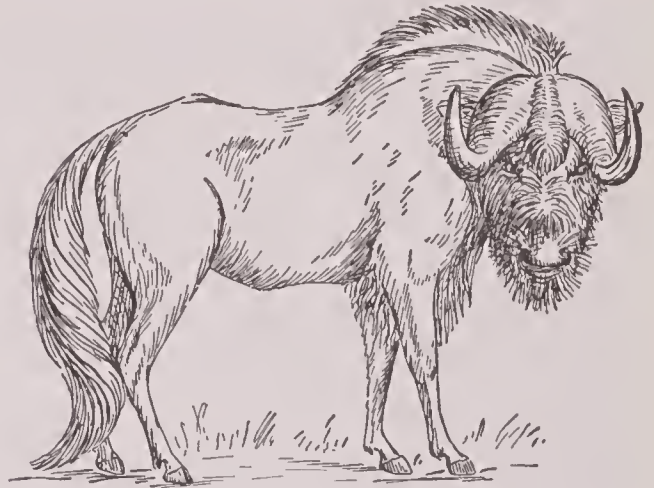
fossil remains. Porphyritic gneiss presents large, distinct crystals of feldspar, which traverse several of the foliated layers. Gneiss often contains hornblende, in place of mica, and then receives the name of sycnitic gneiss. The only difference between this rock and granite consists in the structure, the materials of granite being crystallized promiscuously, those of gneiss being separated in layers. It is the principal rock of very extensive districts; it predominates in Norway and through all the north of Europe. It abounds in the Southern Alps and the Pyrenees and forms the loftiest chains of the Andes of Quito. In the United States, gneiss is a common rock, especially in New England and the eastern and southern parts of New York. See GRANITE; MICA.

**Gnostics**, *nos'tiks*, a general name applied to early schools of speculators, which combined the fantastic notions of the Oriental systems of religion with the ideas of the Greek philosophers and the doctrines of Christianity. They nearly all agreed on the points that God is incomprehensible; that matter is eternal and antagonistic to God; that creation is the work of the *Demiurge*, an emanation from the Supreme Deity, subordinate or opposed to God, and that the human nature of Christ was a mere deceptive appearance. The doctrines of the earliest Gnostics may be reduced to the following heads: God, the highest intelligence, dwells at an infinite distance from this world, in the Abyss, removed from all connection with every work of temporal creation. He is the source of all good. Matter, the crude, chaotic mass of which all things were made, is, like God, eternal, and it is the source of all evil. From these two principles, before time commenced, emanated beings, called *aeons*, which are described as divine spirits, inhabiting the Pleroma, or plenitude of light, which surrounds the Abyss. The world and the human race were created out of matter by one aeon, the Demiurge, or, according to the later systems of the Gnostics, by several aeons and angels. The aeons made the bodies of man of matter; hence the origin of evil in man. God gave man the soul. What are called gods by men are merely such aeons or creators, under whose dominions man became more and more wicked and miserable. To destroy the power of the creators and to free man from the power of matter, God sent the most exalted of all aeons, Christ. All the Gnostic systems admit a good and an evil principle and are usually classified into three schools, that of Basilides and Valen-

## Goat

tinus; that of the Cleintines; that of the Ophites, the last finding the perfect expression of truth in Jesus Christ. There have been no Gnostic sects since the fifth century.

**Gnu**, *nu*, the name given to two species of South African antelopes. The gnu of either sex has horns projecting slightly outward and downward, then bending abruptly upward, so



GNU

that the head looks like a buffalo's. It has bristly black hair about the face and muzzle, a white, stiff mane and horse-like tail. The animal is about nine feet long and stands about four feet high at the shoulder. Gnus live in herds and are said to be fierce when attacked, but when taken young they have been found capable of domestication. The *brindle gnu* is larger than the *common gnu* and has black stripes on the neck and shoulders and a black tail. When alarmed, either species will wheel in a circle once or twice before running away.

**Goat**, a well-known animal with hollow, erect horns, turned backward. The male is generally bearded under the chin. Goats are



ANGORA GOAT

nearly of the size of sheep, but they are stronger, less timid and more agile. They frequent rocks and mountains and subsist on scanty, coarse food. Their milk is sweet, nourishing and medicinal, and their flesh furnishes food. Goats are on many varieties, and it is not certainly



## Goat Island

known from which the domestic animal is descended, though opinion favors the wild goat of western Asia. Domestic goats are common in all parts of the world, and are valued for their hair, milk and flesh. In many parts of Europe, Asia and Africa great herds are kept as cattle are kept elsewhere. Goats are often kept as pets and may be harnessed and driven by children. The skin is used for a variety of purposes and yields the leather well known under the name of morocco. The *Angora goat* is furnished with soft, silky hair, of a silver-white color, which hangs down in curly locks eight or nine inches long. Its horns are in a spiral form and extend backward rather than upward from the sides of the head. See CASHMERE GOAT.

**Goat Island**, a small island which divides the current of the Niagara River at Niagara Falls. It is connected with the American shore by a bridge. See NIAGARA FALLS AND RIVER.

**Goat'sucker**, a common name, especially in Europe, for a certain bird that was thought to suck the milk of goats and to poison them. *Nightjar* is another name for the same bird, which is related to our nighthawk and whip-poor-will.

**Gobi**, *go'be*, or **Shamo**, *shah'mo*, an immense tract of desert country, occupying nearly the center of the high tableland of eastern Asia, extending over a large portion of Mongolia and Chinese Turkestan. Its length is probably about 1800 miles, its mean breadth between 350 and 400 miles and its area 300,000 square miles. Its general elevation is over 4000 feet above sea level. The East Gobi is occupied by different tribes of the Mongolian race, who have numerous herds of camels, horses and sheep. This tract is supposed at one time to have been a great inland sea. See DESERT.

**God**, the Supreme Being, worshiped by most civilized nations. The Christian God is an infinite and absolute being; a perfect personal spirit—eternal, immutable, omniscient, omnipotent and perfectly good, true and righteous. The arguments for the existence of God have been divided into the ontological, the psychological, the cosmological, the physico-teleological and the moral. The *ontological* argument starts from the idea of God itself and professes to demonstrate the existence of God as a necessary consequence from that idea. The manner in which it was stated by Anselm, in the eleventh century, is this: "God must be thought of as that being than whom none can be thought

## God

greater; but this being, the highest and most perfect that we can conceive, may be thought as existing in actuality as well as in thought—that is to say, may be thought as something still greater; therefore God, or what is thought as greatest, must exist not only in thought but in fact." This argument has been presented in other forms. Descartes, while refuting Anselm's form of the ontological argument, revived it himself in another form. Applying the test of truth which he derived from his celebrated formula—"I think, therefore I am"—that whatever we clearly and distinctly perceive to belong to the true and unalterable nature of a thing may be predicated of it, he found on investigating God that existence belongs to his true and unalterable nature and therefore may legitimately be predicated of him. Another argument, called the *psychological*, was adduced by Descartes to prove the existence of God, which, although not the same as the ontological argument, appears to resemble it. It starts from the idea of a supreme and perfect being, but it does not assert the objective existence of that being as implied in its idea, but infers such objective existence on the ground that we could have acquired the idea only from the being which corresponds to it. The *cosmological* argument starts not from an idea, but from a contingent existence, and infers from it an absolutely necessary being as its cause. The argument is: Every new thing and every change in a previously existing thing must have a cause sufficient and pre-existing. The universe consists of a system of changes. Therefore the universe must have a cause outside of and before itself. The argument called the *physico-teleological* is that which is commonly known as the argument from design and has been fully illustrated by Paley in his *Natural Theology*. It is simply this, that in nature there are unmistakable evidences of the adaptation of means to ends, which lead us inevitably to the idea of one that planned this adaptation, that is, of God. The *moral* argument is derived from the constitution and history of man and his relations to the universe, being based on such considerations as our recognition of good and evil, right and wrong, the monitions of conscience and the fact that a moral government of the world may be observed. Another argument is based on the alleged fact that a belief in the existence of a supreme being is everywhere found to be implanted in the breast of man. This argument is used among others by Cicero,







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GEORGE WASHINGTON GOETHALS

## Godard

and many thinkers are inclined to give a good deal of weight to it; still it is pronounced by others to be at best only a probable argument, if it may be accepted as valid to prove anything at all. Others argue the existence of God from the manifestations which he has made of himself to men, but these, as well as miracles, it is admitted even by Christian theists, can only be accepted as real by such as previously believed in the divine existence.

**Godard**, *go dahr'*, BENJAMIN (1849-1895), a French musician, born in Paris. He entered the Paris conservatory and soon attracted attention by his compositions, especially for the violin. They do not display remarkable genius, but are graceful and melodious. He also wrote several operas, none of which achieved special success, besides many symphonies, concertos and songs.

**Godavari**, *go dah'va re*, a large river of central India, which rises about 50 miles from the shore of the Indian Ocean, flows across the Deccan from the Western to the Eastern Ghats in a general southeasterly direction and, after being joined by several affluents, falls by three principal mouths into the Bay of Bengal. after a course of 900 miles. Before the river divides, three rocky barriers obstruct navigation.

**Godfrey de Bouillon**, *de boo yoN'*, (about 1058-1100), duke of Lower Lorraine and one of the leaders of the First Crusade. After the conquest of Jerusalem he took the title of baron and Defender of the Holy Sepulcher, refusing the title of king which his followers wished to bestow on him. At Ascalon with twenty thousand men he defeated the sultan of Egypt with four hundred thousand, and he then devoted himself to the organization of his government and drew up for his courts of justice a code of laws which was a complete embodiment of feudal jurisprudence. He was buried on Mount Calvary.

**God Save the King**, the national anthem of Great Britain. Its origin is somewhat obscure. It is claimed that Henry Carey was the author of both words and music, but there is also evidence that the hymn was adapted from a much older tune. The same music has been used for a national air in Germany and one in Russia, while in the United States one of the most popular of patriotic songs, *My Country, 'Tis of Thee*, is sung to it.

**Godwin**, MARY (1759-1797), an English writer, also well known by her maiden name of Wollstonecraft. She was married in 1797 to William Godwin, and their daughter was

## Goethe

later Mrs. Shelley. Among her works are *Thoughts on the Education of Daughters* and *Vindication of the Rights of Women*.

**Goethals**, GEORGE WASHINGTON (1858- ), American soldier and engineer, born in Brooklyn, New York. He graduated from the United States Military Academy at Annapolis in 1880, was immediately appointed second lieutenant of engineers, and by 1909 had attained the rank of colonel in the engineer corps. He was chief of engineers during the Spanish-American War, and after February, 1907, was in complete charge of all work on the Panama Canal, which his engineering skill and administrative ability successfully hastened to completion. In 1914 he was made first governor of the Canal Zone, and in 1915 was raised to the rank of major-general by special act of Congress.

**Goethe**, *gō' té*, JOHANN WOLFGANG VON (1749-1832), the greatest figure in German



JOHANN WOLFGANG VON GOETHE

literature, born at Frankfort-on-the-Main, August 28, 1749. His father, who was a Doctor of Laws and an imperial counselor, was a well-to-do citizen and an admirer of the fine arts. At an early age young Goethe learned the French language, and a French theatrical company, performing at Frankfort, awakened his taste for the stage. Drawing, music, natural science, the elements of jurisprudence and the languages



occupied him until, in 1765, after the breaking off of a youthful love affair, he was sent to the University of Leipzig to prepare himself for the legal profession. Here he followed no regular course of studies, but he learned much about men. Goethe began at this period what he kept up throughout his life, the practice of embodying in a poem, or in a poetical form, whatever occupied his mind intensely; and no one, perhaps, was ever more in need of such an exercise, as his nature continually hurried him from one extreme to another.

In 1768 he left Leipzig, and after an illness of some length he went in 1770 to the University of Strassburg, to pursue the study of law, according to the wish of his father. At Strassburg he became acquainted with Herder—a decisive circumstance in his life, as Herder helped him to free himself from the restraints of French classicism and inspired his mind with views of poetry more congenial to his character than any which he had hitherto conceived. In 1771 he took the degree of Doctor of Jurisprudence and shortly afterward went to Wetzlar to practice law. While there he fell in love with a young lady who was betrothed to a friend of his, and he soon left Wetzlar in consequence. This was the experience which formed the basis of his *Sorrows of Werther*. The attention of the public was first forcibly attracted to him by his drama *Götz von Berlichingen*, which appeared in 1773, and in the following year he became world-famous on the publication of *The Sorrows of Werther*.

Not long after the publication of this work, Charles Augustus, the hereditary duke of Saxe-Weimar, made the acquaintance of Goethe, and when he took the government into his own hands, he invited Goethe to his court. Goethe accepted the invitation, and late in 1775 he arrived at Weimar. Wieland was already there, having been the duke's tutor; Herder was added to the band in 1776; Schiller was afterward one of its members for a few years; and other poets, critics and novelists were gathered round these chiefs. Goethe was the leading spirit of the group, even during the last quarter of the eighteenth century, when these men and others were constructing and guiding the literature of all Germany; and his supremacy became yet more absolute afterward, when for another generation he stood alone. In 1786 he set out on a journey to Italy, where he remained two years. This residence in Italy had the effect of developing still further his artistic powers. Here his *Iphi-*

*genie* was matured, *Egmont* was finished and *Tasso* was projected.

In 1790 was published the earliest form of the first part of *Faust*, which belongs rather to Goethe's whole life than to any particular period of it. At the time that Goethe was engaged in the production of these works he had been pursuing various other studies of a scientific nature with as ardent an interest as if these had belonged to his peculiar province. The result of his studies in botany was a work in which he gives expression to the view that the whole plant and all its different parts may be regarded as variously modified leaves. In the following year (1791) he began to apply himself to optics, and he published a work on this subject also. In 1791 he became director of the court theater at Weimar, and his work here, with the production of *Wilhelm Meister*, occupied him until 1792, when he followed Charles Augustus during the campaign of the Prussians against the revolutionary party in France. In 1794–1796 Goethe published *Wilhelm Meister's Apprenticeship*, a novel which has become well known to English readers through the translation of Carlyle and which contains some of the most beautiful songs ever written. His next work of importance was *Hermann und Dorothea* (1797), a narrative poem, in hexameter verse, the characters of which are taken from humble life. In 1806 Goethe married Christiane Vulpius, with whom he had lived since 1788 and of whom he always spoke with warmth and affection. In 1809 was published *Elective Affinities*, another novel, and between 1811 and 1814 appeared his autobiography, one of the finest autobiographies in any language. The *Westöstlicher Divan*, a remarkable collection of Oriental songs and poems, appeared in 1819. Goethe's last work was the second part of *Faust*, completed in 1831.

**Gog and Ma'gog**, names mentioned several times in the Bible referring to a northern land. Ezekiel predicted the destruction of Gog and Magog by the Jews, and mention is also made of them in Revelation. Interpreters generally understand them to be symbolical expressions for the heathen nations of Asia. Gog and Magog are also the names given to two reputed giants of early British history, whose statues are erected in the Guildhall in London.

**Go'gol.** NIKOLAI VASSILYEVITCH (1809–1852), a famous Russian writer. He held for a short time a government position and later had an instructorship in literature and history,

## Goiter

but gave up both positions to devote himself to literature. His first work, a series of sketches called *Evenings at a Farm House near Dikan'ka*, showed that he was a writer of no ordinary ability, and this fact was further proved by his later writings. Among these were two other series of sketches, *Mirgorod* and *Arabesques*; *Revizor*, a comedy, and *Dead Souls*. All of these works show a remarkable power of describing types of Russian life.

**Goiter** or **Goitre**, a disease which is marked by the swelling of the thyroid gland, situated in the front of the throat. It affects women more frequently than men, and cases of it are to be seen in most countries, though in some regions it is particularly prevalent.

**Goktscha**, *gok'chah*, or **Sevanga**, *sye vahn'ga*, LAKE, a lake in Russian Armenia, occupying a triangular cavity 540 square miles in extent, at an elevation of 6400 feet above the sea. It receives the water of several streams, but has no considerable outlet.

**Golcon'da**, an ancient city of India, 7 mi. n. w. of Hyderabad. The ruins include the burial places of the ancient sovereigns of the kingdom of Golconda, and an ancient fortress, which is now used as a state prison. Golconda was of old famous for diamonds, which, however, were probably found in the territory to the south of the city and were merely cut and polished at Golconda. The expression "richer than Golconda" became proverbial.

**Gold** is a precious metal of a bright yellow color, the most ductile and malleable of all the metals (See DUCTILITY; MALLEABILITY). It may be beaten into leaves so exceedingly thin that one grain in weight will cover 56 square inches, and it will take 280,000 such leaves to make an inch in thickness. A single grain may be drawn into a wire 500 feet long, and an ounce of gold can be made to cover a tiny silver wire more than 1300 miles in length. It may also be melted and remelted with scarcely any diminution of its quantity. It is soluble in nitro-muriatic acid, or *aqua regia*, and in a solution of chlorine, but it does not tarnish on exposure to the air. It is one of the heaviest metals, being about nineteen and one-third times heavier than water.

The fineness of gold is estimated by carats, pure gold being twenty-four carats fine. Jeweler's gold is usually a mixture of gold and copper in the proportion of three-fourths of pure gold to one-fourth of copper. Gold is seldom used for any purpose in a state of perfect purity, on

## Gold

account of its softness, but is combined with some other metal to render it harder. Standard gold, or the alloy used for the gold coinage, consists of twenty-two parts of gold and two of copper and is therefore called twenty-two carats fine. Articles of jewelry in gold are made of every degree of fineness up to eighteen carats, that is, eighteen parts gold to six parts alloy. The alloy of gold and silver is found already formed in nature. It is distinguishable from that of copper by its pale yellow color, the copper alloy having a color bordering upon reddish-yellow. Palladium, rhodium and tellurium are also met with as alloys of gold.

Gold has been found in smaller or larger quantities in nearly all parts of the world. It is commonly found in reefs, or veins, amid quartz, and in sand and gravel; it is separated, in the former case, by quarrying, crushing, washing and treatment with mercury. The rock is crushed by machinery and then treated with mercury, which dissolves the gold, forming a liquid amalgam. The mercury is then distilled, and the gold is left behind. According to another method the crushed ore is fused with metallic lead, which dissolves out the gold, the lead being afterward separated by placing the alloy in a porous cup and heating. The lead melts at a lower temperature than the gold and is absorbed by the cup, leaving the gold free. This process is called *cupellation*. Gold is extracted from sand and gravel by washing and is obtained in the form of dust, grains and nuggets.

In modern times large supplies of gold were obtained from Peru, Bolivia and other new countries. Till the discovery of gold in California, a chief source of the supply was the Ural Mountains, in Russia. An immense increase in the total production of gold throughout the world was caused by the discovery of gold in California in 1848, and the opening of the equally rich gold fields of Australia in 1851. Latterly the yield from both sources has considerably decreased. Gold mines have also been extensively worked in New Zealand. In British Columbia and the Yukon are the chief Canadian gold fields, but the metal is also found in Nova Scotia, Ontario and Quebec. Saskatchewan has a few small placer mines. In the United States, apart from California, gold in considerable quantities is found in many states and territories, chiefly Colorado, Dakota, Idaho, Montana, Nevada and in Alaska. South Africa has recently taken a conspicuous position as a gold-



## Gold-beating

producing country, the mines of the Transvaal being among the most valuable in the world. Natal and New Caledonia have also important gold fields. The annual production of gold for the world amounts to about \$450,000,000. Of this Australasia produces about \$72,000,000; Africa about \$150,000,000, and the United States about \$95,000,000.

**Gold-beating**, the art or process of producing the extremely thin leaves of gold used in gilding. The gold which is beaten into leaf is almost pure metal, which has been melted at a greater temperature than fusibility requires. This extra heat gives the gold a greater malleability. It is cast into bars or flat ingots and sent to the gold beater in that form. The workman rolls it into a long, thin ribbon about  $2\frac{1}{2}$  inches wide and then cuts the ribbon into squares. These squares are placed between sheets of peculiar paper, known as "French" paper. It looks like exceedingly close-grained oil paper, and each sheet is about five inches square. Three hundred sheets are piled on one another, and a square of gold is laid on the paper between each two sheets. This forms a book, or, as the gold beaters call it, a *cutch*. The gold beater slips bands of parchment over the cutch, binding all the leaves with the gold squares between them into a solid block. The cutch is laid on a block of stone, which has been faced up square, and with a twenty-pound cast-iron hammer the gold beater begins to flatten out the gold. The hammer falls on the center of the cutch for a time, thus driving the gold out. The cutch is beaten until the gold has expanded to the size of the sheets of French paper. Each sheet of gold is then removed and cut into four squares, so that each sheet is evenly squared. The leaves of gold are cut with a *filling wagon*, which consists of two pieces of sharp-edged reed or bamboo, set in a frame so that the parallel cutting edges will divide the leaf into the proper size in one cut. The leaf is cut on a soft piece of leather, so that steel knives cannot be used. The leaf is handled with pincers made of boxwood. The quartered sheets are laid in the *shoder*, which is like the cutch, except that the leaves are gold beaters' skin. About 1000 of the gold squares are placed in the shoder, and this pile is beaten with a twelve-pound hammer for an hour. Again the leaves are cut into quarters and placed in the *mold*, which, like the shoder, is made up of gold beaters' skin, and the hammer pounds it for nearly seven hours, until the gold is spread out to the size of the mold. The leaves are then

## Golden Fleece

ready to be cut into squares  $3\frac{3}{8}$  inches on a side and laid in books, 25 leaves to each book, 20 books to a pack, so that a pack contains 500 sheets of gold leaf.

Dentists use gold leaf for filling teeth because gold will weld into a solid mass when cold. The dentist's gold leaf is not put through the shoder and mold, but is taken from the cutch, as they use a heavier leaf than gilders, bookbinders and sign painters.

Silver and aluminum leaf are also important products and are made in the same way. Archaeologists have found gold leaf on jars and other household utensils that were made 2000 years B. C. The art was well known in the time of Homer and Pliny. African travelers have found natives who were quite expert in hammering gold into fine sheets.

**Gold Coast**, a British crown colony in West Africa, extending along the Guinea coast for 350 mi. and stretching inland to an average distance of 50 mi., having an area of about 40,000 sq. mi., exclusive of Ashanti and a protectorate, annexed in 1901. The chief forts and settlements are Cape Coast Castle, Elmina, Accra, the capital, Axim, Saltpond and Winneba. The soil is exceedingly fertile, but the climate is unhealthful. The chief products are gold, palm oil, ivory, copal and caoutchouc. Population in 1911, 1,502,899.

**Golden Age**, the legendary period in the history of almost all races, supposed to have been a time of perfect innocence and enjoyment; the earth was common property and brought forth without cultivation all things necessary for happy existence, while man and beasts lived in perfect harmony. Among the Romans this period was supposed to correspond with the reign of Saturn.

**Golden Bull**, the name given to the decree issued by Emperor Charles IV in 1356, to regulate the manner of election of the emperors and the number and rights of the electors. The number of electors was fixed at seven—the archbishops of Mainz, Cologne and Trèves, the king of Bohemia, the count palatine of the Rhine, the duke of Saxony and the margrave of Brandenburg. It was provided that in case of an interregnum the administration of the Empire should lie with the elector palatine and the elector of Saxony. The vital question as to what part the pope should have in the affairs of the Empire was left untouched.

**Golden Fleece**, in classical mythology, the fleece of gold in quest of which Jason made the

Argonautic expedition to Colchis. See ARGONAUTS; JASON.

**Golden Gate, THE**, a channel which connects San Francisco Bay with the Pacific Ocean. It is one mile wide and four miles long and is of sufficient depth for ocean steamers. On the south shore are Forts Pointe and Mason. Drake named this channel about 1578.

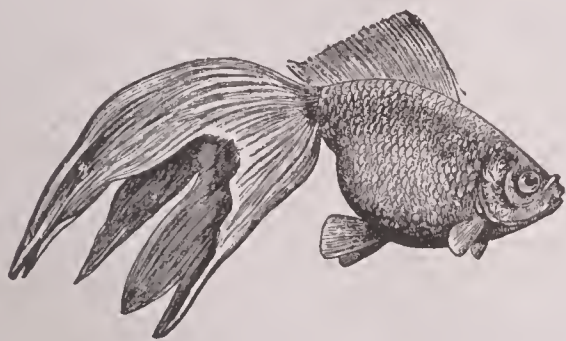
**Golden House**, the palace of Nero, built in Rome and so called because of its magnificence and beauty. In its court was a colossal statue of Nero, 120 feet high. The building extended over most of the Esquiline Hill and over that part of the land on which are the ruins of the Colosseum. There are few remains of this palace.

**Golden Number.** See METONIC CYCLE.

**Golden-rod**, a genus of the Compositae, chiefly natives of North America, where are found more than one hundred species. Most of the golden-rods have erect, rod-like stems, with little flowers, usually yellow, packed in very small heads, which are themselves grouped together to form large, showy clusters. No wild flower is a greater autumn favorite than the golden-rod.

**Gold'finch**, a favorite cage bird in Europe, much loved because of its pleasing song and its fondness for those who tend it. It is a beautifully colored finch, in which red, yellow, black and white are pleasingly mingled. A common bird throughout Europe, it has been introduced into the United States, and large numbers live in the vicinity of eastern cities.

**Gold'fish**, the name of a beautiful species of carp, found in the fresh waters of China. It is



FANTAIL GOLDFISH

greenish in color in the natural state, the golden yellow color being found only in domesticated specimens and retained by artificial selection. These fishes are reared by the Chinese in small ponds and in basins or porcelain vessels and are kept for ornament. By careful selection, many strange varieties and monstrosities have been propagated. They are now distributed over nearly all the civilized parts of the world and are

commonly kept in aquariums. In large ponds they readily revert to the color of the original stock.

**Gold Lace**, a fabric woven of gilded silk threads, which are made in the following manner: A rod of silver is covered with gold leaf and drawn into a wire so fine that a mile of it weighs only an ounce. This delicate wire is then flattened, extended still farther and twisted compactly around a silk thread.

**Golds'boro**, N. C., the county-seat of Wayne co., 50 mi. s. e. of Raleigh, on the Neuse River and on the Southern, the Atlantic Coast Line and other railroads. The city is in an agricultural region and has cotton and oil mills, machine shops and manufactories of furniture, agricultural implements and other articles. It has a public park and is the seat of a state normal school for negroes, the Eastern Insane Asylum and an Odd Fellows' orphanage. Population in 1910, 6107.

**Gold'smith**, OLIVER (1728-1774), an Irish writer of prose and verse, born at Pallas, County Longford, Ireland. He graduated from Trinity College, Dublin, and was advised by an uncle, who had already borne a large part of the expenses of his education, to prepare for holy orders. Rejected for holy orders, he became tutor in a family, but soon lost his situation on account of a dispute with the master of the house over a game of cards. He then went to Edinburgh to study medicine. Here he remained eighteen months, during which time he acquired some slight knowledge of chemistry and natural history. At the end of this period he went to Leyden, where he studied for nearly a year, and afterward he wandered over a large part of France, Germany, Switzerland and Italy. He had no money to pay his expenses during this walking tour, but his kindliness and humor won him friends everywhere, and his skillful playing of the flute gained him a scanty living. While at Padua he took a medical degree.

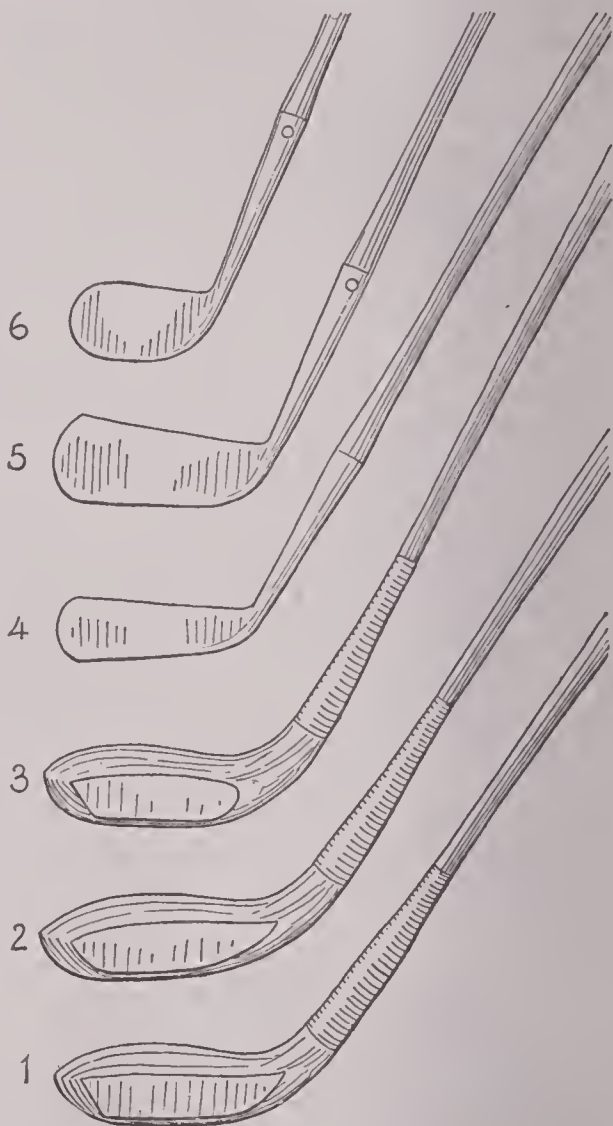
He reached London in 1756 with a few cents in his pocket, and then followed some years of hard experience as a chemist's assistant, a medical practitioner, a proof reader and a school usher. Turning his attention to writing, he conducted a department in the *Monthly Review* and wrote essays in the *Public Ledger* and in a weekly pamphlet entitled *The Bee*; but it was not until the publication, in 1764, of *The Traveler* that he won recognition. Two years later appeared *The Vicar of Wakefield*. This novel, which to the present day is popular, was sold to the publishers



for sixty pounds, that Goldsmith might obtain money to pay his landlady, who had had him arrested for debt. In 1768 his comedy of *The Good-natured Man* was acted at Covent Garden with but indifferent success, but *She Stoops to Conquer*, produced some years later, attained at once the great popularity which it has kept to the present day. His poetical fame was greatly enhanced by the publication of his *Deserted Village* in 1770. Goldsmith completed, as mere task-work, histories of England, Greece and Rome, and a *History of the Earth and Animated Nature*, of no scientific value. Recognized as one of the great writers of the time, he was sought after by the most famous literary men and was a member of the renowned club to which Johnson and Reynolds belonged. His last days, however, were embittered by the pressure of debt, incurred partly by his improvidence and partly by his generosity. The manners of Goldsmith were eccentric, even to absurdity; but his kindly and sympathetic nature and his rare humor always won him loyal friends. Washington Irving has written a remarkably sympathetic biography of Goldsmith.

**Golf**, a popular outdoor game, played with clubs and balls over large fields, or *links*. A series of small, round holes are cut in the turf at distances of from 100 to 600 yards or more from one another, according to the nature of the ground, and these are arranged to form a circuit, or *round*, the ninth or eighteenth hole being near the starting point. These holes are about  $4\frac{1}{2}$  inches in diameter and at least 4 inches deep. Each one is marked by a metal flag on an upright iron rod, which is removed from the hole during play and put back afterwards to guide succeeding players. Around each hole the ground is made perfectly level and is covered with a short, velvety turf, so that the last strokes toward the hole may be made with no obstacle in the way. This smooth grassy plot is called the *green*. Between the holes obstructions of various kinds are permitted. These are either such natural things as hills, rocks and brooks, or they may be artificially constructed ditches and mounds, all intended to make the play difficult and so to demand greater skill of the player. If played by two, the game is started by one of the players putting his ball on a little *tee*, or elevation of sand, and driving it as far as possible toward the first hole. As soon as he has played, his opponent begins in a similar manner, and from then on they play alternately from the spots where their balls lie, until both have *holed out*, that is, put their

balls into the first hole. The one who does this with the fewer strokes wins that hole. The balls are then taken to a spot near the first hole, and there they are driven off from a tee as before, except that the winner of the first hole is the first to play on the second. After this manner the game is continued until the nine holes are played. Two styles of game prevail. In one style the winner of the game is the person who



GOLF CLUBS

1, Driver; 2, brassie; 3, putter; 4, cleek; 5, iron; 6, niblick.

puts his ball in the nine holes with the fewer strokes. In the other style, the person who wins the most holes wins the game. The former is known as *match play*; the latter, as *medal play*. Three or four or more may play at one time with such modifications of the rules as are made necessary. The clubs, or sticks, are of different sizes and shapes, according to the use to which they are put. One club is designed to drive the ball a long distance; another, to raise it high in the air; a third, to take the ball out of

## Goliath

a difficult position; a fourth, to use on the green only. Each club has its own particular name, and different players sometimes favor different clubs for the same purpose. The ball is small and round and is painted white, in order that it may be distinctly seen. Usually the surface is more or less roughened, so that the clubs will catch it more fairly.

No one of the outdoor games has more exacting rules or is played with greater formality. There are public links in the parks of large cities; but as a rule the game is played on grounds belonging to private clubs or associations, and by members only. The game is a social one, played principally by well-to-do people, and the rules of etiquette are perhaps more strictly observed than in any other outdoor pastime. Contests are often held between different clubs, and tournaments in which several clubs take part are not uncommon. Every year a national tournament is held, and not infrequently players come from abroad to take part in these. The best players have an astonishing amount of skill, and the number of strokes required to carry the ball over difficult ground and into the hole is surprisingly small.

**Goli'ath**, a giant of Gath, slain by David (*I Sam. xvii*). His height was "six cubits and a span," which, taking the cubit at twenty-one inches, would make him a little over eleven feet. The Septuagint and Josephus read, "*four* cubits and a span."

**Gomez y Baez**, *go'mes e bah'es*, MAXIMO (1826-1905), a Cuban general, born at Bani, Santo Domingo. He served in the Spanish army, but became an opponent of Spanish rule in Cuba, quit the army and settled as a planter. During the insurrections of 1868-1878, he was an active commander of the Cuban forces. At the close of the struggle he went to Jamaica and then to Santo Domingo, but in 1895 returned to Cuba and became general in chief of the forces of the Republic. When the Americans landed in the island, he showed marked friendship and coöperated with them throughout the campaign. He was deposed from the command of the army in March, 1899, for receiving for his troops the \$3,000,000 voted by the American Congress.

**Gomp'ers**, SAMUEL (1850- ), an American labor leader, born in London, Eng. When a young man he came to America, where he became interested in the cause of labor and the betterment of the working classes, while employed at his trade as a cigar maker. He was one of the founders of the American Federation of Labor

## Gonsalvo de Cordova

and was its first president, being reëlected annually for many years, with one exception. He is also a vice-president of the National Civic Federation.



SAMUEL GOMPERS

**Gon'dola**, a sort of barge, curiously ornamented, navigated on the canals of Venice. The middle-sized gondolas are upward of 30 feet long by 4 feet wide, and they always terminate at each end in a sharp point, which is raised perpendicularly, to about the height of a man. Toward the middle of the barge there is a curtained chamber for passengers.

**Gonsalvo de Cordova**, *gon thahl'vo da kor'do vah* (GONZALO HERNANDEZ Y AGUILAR, about 1453-1515), a famous Spanish commander, known as the *Great Captain*. He distinguished himself in the Portuguese War, which began in 1475, and in the war with the Moors, which ended with the conquest of Granada in 1492. In 1495 he was sent to assist Ferdinand, king of Naples, against the French, and in less than a year he had driven the French out of Naples. In 1500 Louis XII of France and Ferdinand of Aragon decided on the conquest of Naples, and Gonsalvo was sent to capture the city. He was successful in this enterprise, but Spain and France could not agree as to the division of the spoils, and a war broke out, in which Gonsalvo won the victory for Spain. He was appointed viceroy of Italy, but some years later he was deprived of his office through the jealousy of the king.



**Goober.** See PEANUT.

**Good Friday**, a fast of the Christian church, in memory of the crucifixion of Jesus, kept on the Friday of Holy Week, that is, the Friday before Easter. It has been celebrated from a very early period. In the Roman Catholic Church the keeping of this fast includes prayers for all classes of people, heretics, schismatics, pagans and Jews, besides the "Adoration of the Cross," but no mass is said. In all Protestant churches the day is observed with much solemnity, except among Presbyterians. The practice of eating cross-buns on this day has now no religious significance.

**Good'rich**, SAMUEL GRISWOLD (1793-1860), an American author, best known as Peter Parley, the pseudonym under which he wrote. He edited and compiled about one hundred seventy volumes of children's books. In Hartford, and afterward in Boston, he conducted various magazines, and at one time or another he had on his staff many writers who afterward became famous, among them Nathaniel Hawthorne and Nathaniel Parker Willis. In 1851 Goodrich acted as American consul at Paris, and while there he published in French a work on American geography and history. Among the works which were entirely written by him are *Sketches from a Student's Window*, *Poems* and *Sow Well and Reap Well*.

**Good Roads Movement.** In the demand for good roads which has spread throughout the country, no other one factor has been so important as the automobile. It is only within the last few years, therefore, since automobiles have been commonly used, that the demand has become so strong that county, state and national governments are turning their attention to means of satisfying it. There are those who believe that the question of good roads outside of thickly settled communities is chiefly a national problem, and they have gone so far as to insist that the federal government should construct and maintain a "broad and comprehensive system of highways." Investigation proves, however, that it would cost about \$660,000,000 to build such a road and \$92,000,000 annually to keep it up—obviously prohibitive sums. Previous to 1914 the national government gave aid chiefly through its "good road train" (see ROAD) or through small appropriations, but early in that year a bill was passed providing that \$25,000,000 annually be divided among the states for road improvement, each state government to provide an amount

equal to that which it received. Many of the states, especially New Jersey and Massachusetts, had previously been very generous in their road appropriations, and it was believed that the new measure would act as a spur to all.

One of the most important outgrowths of the good-roads agitation is the plan for the so-called Lincoln Highway, which is to stretch from sea to sea. The president of the Lincoln Highway, in writing of the plans, says that it is to "last for all time, as does the Appian Way," and to be "a broad, smooth, dustless thoroughfare, which will take one from New York through New Jersey, Pennsylvania, Wyoming, Colorado, Utah and Nevada to California." Most of the cost is to be cared for by pledges from those to be benefited—from automobile companies, cement companies and the like; so that it will not be a great drain on either state or nation.

**Good Templars**, INDEPENDENT ORDER OF, THE, a fraternal order, organized at Fayetteville, N. Y., in 1851. It is a temperance brotherhood, which combines the principles of teetotalism with certain rites, secret signs, passwords and insignia peculiar to itself. The first grand lodge was established in 1852. The organization consists of local subordinate lodges, county district lodges, national grand lodges and an international right worthy grand lodge. A juvenile order is also attached. There are now 100 grand lodges with over a half million members, including the Juvenile Order of nearly 200,000 members, located in many civilized countries.

**Good Will**, the benefit derived from a business beyond the mere value of the capital, stock, funds or property employed in it. Good will arises in consequence of the general public patronage and encouragement which the business receives, due to its constant and habitual customers, or to its location, reputation and business principles. It is legally considered a subject of sale or disposal, along with the stock, premises, fixtures and trade debts.

**Good'win**, NATHANIEL CARL (1857- ), an American actor, born in Boston. His first appearance was in a play called *Law in New York*, in which he was very successful, and his next success was *Black-eyed Susan*. In 1877 he married Eliza Weathersby. For the next fifteen years most of his work was in light comedy. After this he played *A Gold Mine*, *A Gilded Fool*, *In Mizzoura*, *An American Citizen*, *Nathan Hale*, *The Cowboy and the Lady*, *When We Were Twenty-one* and *The Genius*.

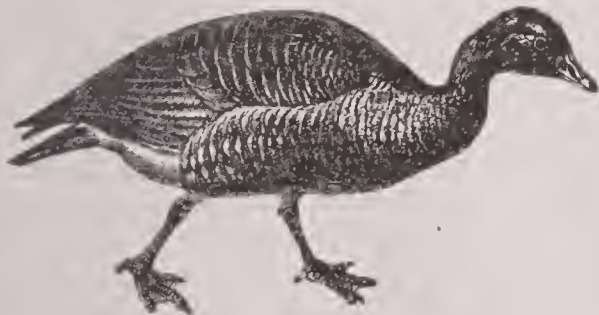
## Goodyear

He was married five times, his second wife being Maxine Elliott, a well-known actress.

**Good'year**, CHARLES (1800-1860), an American inventor, born at New Haven, Conn. His early education was meager, and he began his career in the manufacture of hardware in Philadelphia. His attention was early called to the improving of the processes of manufacturing rubber, which was sticky in warm weather and brittle in cold. By dipping the rubber in nitric acid, he ascertained that the surface was hardened, so that it was to a large extent free from these defects. This process was in general use in the manufacture of rubber shoes for many years. Goodyear still further continued his investigations, and by an accident he perfected his process of hardening or vulcanizing rubber. He was awarded the great coronal medal at the London Exposition in 1851 and the grand medal of honor at the Paris Exposition in 1855, and he was also presented with the cross of the Legion of Honor. His patents are now in general use in all countries in the manufacture of rubber, and credit is due him for discovering many practical uses of rubber. See INDIA RUBBER; RUBBER MANUFACTURE.

**Goom'ti**. See GUMTI.

**Goose**, a large web-footed bird, related to the duck and the swan. The domestic goose,



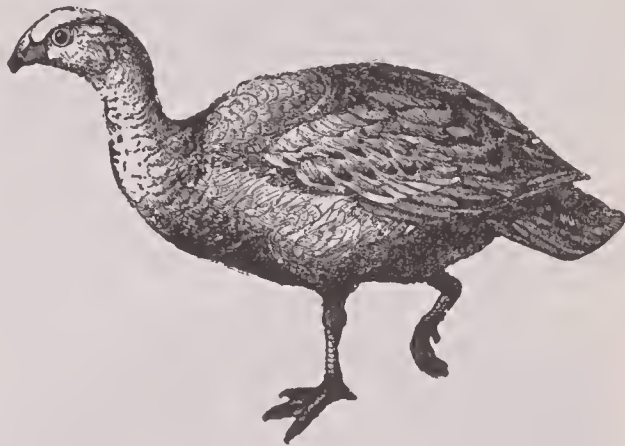
GRAY GOOSE

of which there are many varieties, all nearly alike, lives chiefly on land and feeds on grass. It is valued for the table, for its quills and for its fine, soft feathers, which are used in making pillows and mattresses. The *Canada goose* is the common wild goose of the United States, known in every part of North America. They are also found in Europe. In the spring these geese are seen flying northward in V-shaped flocks. As cold weather approaches, the geese return to the South. Other species are the *gray goose*, or *gray-lag*, of Europe and northern Asia, and the *pigeon goose*, of Australia and Tasmania.

**Goose'berry**, a low branching shrub, growing wild in Siberia, in the north of Europe and

## Gopher

in North America. The branches are armed with numerous prickles and bear three to five-lobed leaves and inconspicuous flowers. The fruit is a succulent berry, very wholesome and



PIGEON GOOSE

**agreadle**, of various colors—whitish, yellow, green and red. Gooseberries are popular fruits for preserving and are extensively cultivated, being easily raised.

**Gooseberry Worm** or **Gooseberry Caterpillar**, the larva of a moth, one of the most destructive enemies of the European gooseberry. In America the fruit suffers from a different moth, known by the same name—a moth which has pale gray wings bearing a dark band and a whitish line near the base. The larvae live in the berries, several of which they spin together by means of a silk which they secrete.

**Goose'foot** is a genus of plants indigenous to the temperate parts of the Eastern continent. They are weeds common in waste places and bear small, greenish flowers, gathered in small clusters, which are themselves clustered openly. Several species are now troublesome in the United States.

**Gopher**, *go'fur*, the name of various burrowing animals, natives of North America. The



STRIPED GOPHER

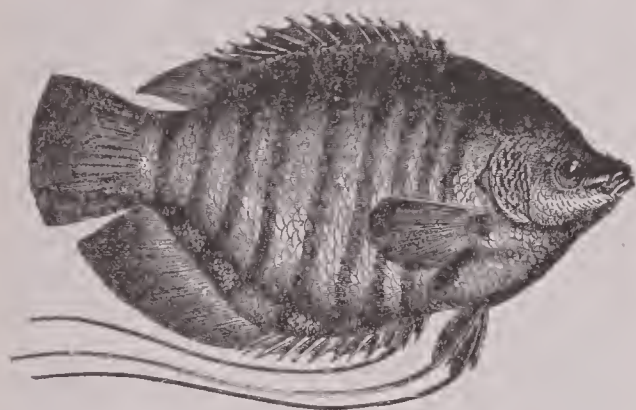
true gopher is remarkable for having fur-lined pouches on the sides of its face and neck. In some species these pouches extend from the mouth to the shoulders. They are used in carrying food and also in carrying out dirt



## Goramy

from the burrows. The common *striped gopher*, or *prairie squirrel*, of the West is a different animal. It does considerable damage to fields, making burrows so numerous that a network of passageways is formed under the surface. The name gopher was formerly applied by the early French settlers to any animal that honey-combed the soil. Several burrowing squirrels also have this name.

**Go'ramy** or **Gourami**, *goo'ra my*, a Chinese fish allied to the climbing perch. It is one of the few fishes that build nests, and these are



GORAMY

constructed by interweaving the stems and leaves of water plants. The goramy is considered excellent food. In Java it is kept in jars and is fattened for the market on water plants.

**Gor'dian Knot.** According to ancient legend, Gordius, a Phrygian peasant, was, through the intervention of the gods, raised to the honor of king of Phrygia. Through gratitude he dedicated to Zeus his cart and yoke, the knot of which was tied in an exceedingly skilful and complicated manner. Oracles had foretold that whoever should unloose the knot should be the ruler of all Asia. Many attempts had been made to untie the knot, but when Alexander the Great came to Gordium he cut the knot with his sword and asserted that he had realized the prophecy.

**Gor'don**, CHARLES GEORGE (1833-1885), a British soldier, known as *Chinese Gordon* and *Gordon Pasha*. He served through the Crimean War, and after the Chinese War in 1860 he remained in China, rose in rank and for his effective service in putting down rebellions was honored by China and by England. From 1877 to 1879 he was governor of the Sudan under the khedive. For a few months in 1882 he held an appointment at the Cape, and he had just accepted a mission to the Kongo from the king of the Belgians, when he was sent to withdraw the garrisons shut up in the Sudan by the insur-

## Gordon

gent Mahdi. He was besieged in Khartum by the rebels and gallantly held that town for ten months. A British force under Lord Wolseley was dispatched for his relief, but arrived in



WILLIAM CRAWFORD GORGAS

January, 1885, to find that the town had been treacherously betrayed into the hands of the Mahdi and Gordon had been murdered.

**Gordon**, CHARLES WILLIAM (1860- ), best known by his pen name, Ralph Connor, a Canadian author and Presbyterian minister, born in Ontario. He graduated from Toronto University and studied theology in Knox College. For several years he was missionary to the Canadian northwest territories and later became pastor of a church in Winnipeg. He wrote a number of interesting religious stories, abounding in vivid scenes from western life. *The Sky Pilot* and *The Man from Glengarry* have become popular, while *Black Rock* is probably the best known. *The Prospector*, *The Pilot of Swan Creek*, *Given*, *Corporal Cameron*, *The Doctor of Crow's Nest* and *The Foreigner* are others of his best books.

**Gordon**, JOHN BROWN (1832-1904), an American soldier and politician. After graduating from the University of Georgia he studied law and was admitted to the bar. At the outbreak of the Civil War he entered the Confederate army and won his way by hard service to the rank of lieutenant general. He was severely wounded at Antietam. From 1873 to 1880 and



## Gorgas

again from 1891 to 1897 he represented Georgia in the United States Senate, and he was governor of the state from 1887 to 1890.

**Gorgas, WILLIAM CRAWFORD** (1854– ), an American physician, surgeon-general of the United States Army. He was born in Mobile, Ala., studied at the University of the South, and received his medical training at the Bellevue Hospital Medical College. In 1880 he was made surgeon in the army, and received various promotions before his appointment in 1898 as chief sanitary officer in Havana. He remained there for five years, and did such efficient work that yellow fever was practically eliminated. For his services at Havana he was made colonel by a special act of Congress. In 1904 he was made chief sanitary officer of the Panama Canal Zone, and his work there practically transformed the district from a breeding spot for yellow fever and malaria to a healthful place where Americans can live and work without danger. In 1914 Gorgas was made surgeon-general of the United States army, and in 1915, by special act of Congress, was made major-general.

**Gor'gons**, in Greek mythology, three frightful beings whose bodies were covered with impenetrable scales, whose hands and teeth were of brass and whose hair was composed of serpents. They had the power of turning to stone every one who looked upon them. The two older ones were immortal, but Medusa was killed by Perseus.

**Goril'la**, the largest of the apes. It attains a height of about five and a half feet and is found chiefly in woody regions, around the equator in Africa. It is a thickset animal, with huge shoulders, long arms and short legs, and is clothed with a coat of coarse hair. Its strength is in proportion to its huge frame. Gorillas live mostly in trees and feed chiefly on such things as the fruit and cabbage of the palm tree, the fruit of the gingerbread tree, the papaw and the banana. Their ordinary gait is on all fours, but they readily rise to an erect position, and because of their shorter, broader feet, they walk more easily than the other man-like apes. Though gorillas are naturally timid, they make a terrible defense and rush at their enemies in the manner of bears. They make a sleeping place like a hammock, connecting the branches of the sheltered and thickly-leaved part of a tree with the long, tough, slender stems of parasitic plants, and lining it with the broad, dried fronds of palms or with long grass. The Phœnician navigator Hanno found the name gorilla in use in

## Gortchakoff



GORILLA

the fifth century B. C., in West Africa, but nothing definite was known about the animal until the middle of the nineteenth century.

**Gor'ky, MAXIM** (in full, Alexei Maximovitch Pyeshkoff, 1868– ), a famous Russian novelist and reformer, born at Nijni Novgorod. His parents were in humble circumstances, and during early life he was employed successively as shoemaker, gardener, cook and clerk. Finally, he gave up all employment and became a tramp. During his travels he secured much of the material which he later used in his novels. Among his best-known works, all of which are extremely tragic and are written in an emotional, brilliant style, are *Song of the Falcon*, *Fomâ Gordyëeff*, *The Outcasts* and *Three Men*. In later years Gorky has devoted himself, even in his novels, to spreading the influence of the liberal political movement in Russia. He has also written several dramas, of which the most important are *The Summer Folk*, *The Children of the Sun* and *The Barbarians*, all of which are concerned with the political situation in Russia.

**Gortchakoff, gor'cha kof, ALEXANDER MIKHAILOVITCH**, Prince (1798–1883), a Russian diplomat. He served successively as secretary to the Russian embassy in London, counselor of the embassy at Vienna, plenipotentiary to Stuttgart and ambassador at Frankfort, before he was appointed, in 1854, minister of Russia at Vienna. In 1856 he was made minister of foreign affairs, and from the first his policy was one of opposition



to Austria. In 1863 he was made chancellor of Russia, and while in this position he showed a friendly spirit toward the Northern states in the American Civil War. As a result of the friendly relations between Bismarck and Gortchakoff, Prussia was able to enter upon the course which resulted in the unity of Germany, without fear that Russia would interfere on the side of Austria. As Germany grew more powerful, Gortchakoff's attitude became less friendly, and the outcome of the Russo-Turkish War and the Congress of Berlin led to a break between the two chancellors.

**Gortchakoff**, MIKHAIL, Prince (1795-1861), a Russian general. He took part as an artillery officer in the Battle of Borodino in 1812 and served in subsequent campaigns of the allies against the French. He took a prominent part in the Turkish war (1828-1829), the Polish war (1831), the invasion of Hungary (1849) and in the war with Turkey and the western powers (1853-1855). In the Crimea he held the command in Sebastopol during the siege. After the war he was made governor of Poland.

**Goschen**, *go'shen*, GEORGE JOACHIM (1831-1907), an English politician and financier. He entered Parliament in 1863. In 1868 he became president of the poor law board and subsequently first lord of the admiralty. On several occasions he found himself unable to move with the Liberal party; and when in 1886 Gladstone launched his Home Rule bill for Ireland, Goschen became one of the leaders of the dissenting Liberals who formed the Liberal Unionist party. Some time after, with the consent of his fellow Unionists, he accepted the office of chancellor of the exchequer in Lord Salisbury's government. He is the author of several financial and political pamphlets and of a well-known work on the *Theory of Foreign Exchanges*.

**Gos'hawk**, the largest of the short-winged hawks, formerly used in falconry. It is grayish above, white below, with ashy brown bars. In the United States there is but one species native; this is larger and handsomer than the European species and is commonly called the *hen hawk* or *chicken hawk*.

**Go'shen**, the name of the portion of Egypt assigned to Jacob and his family, when they entered the land to escape famine (*Gen.* XLVII). Goshen was located on the eastern border of the Nile delta, but its boundaries are indefinite. The land was especially well suited to grazing, and it was here that the Hebrews remained until they were enslaved by the Egyptians.

**Goshen**, IND., the county-seat of Elkhart co., 25 mi. s. e. of South Bend, on the Elkhart River and on the Lake Shore & Michigan Southern and the Cleveland, Cincinnati, Chicago & Saint Louis railroads. The city is in a fertile agricultural region and has flour and woolen mills, machine shops, wood-working establishments and large lumber mills and brickyards. It has a fine public library and a good high school. Population in 1910, 8514.

**Gos'nold**, BARTHOLOMEW (?-1607), an English navigator and explorer. In 1602, with an expedition probably equipped by Raleigh, he explored the New England coast from Maine to Buzzard's Bay and returned home with a valuable cargo of furs and woods, which, together with his personal influence, was the chief cause of the organization of the London Company that later colonized Virginia. He went with the first expedition in 1607, but died from fever soon after arriving in America.

**Gos'pels** (good news), the first four books of the New Testament, so called because they give an account of Christ's mission. The first three are known as the synoptic gospels, as they contain about the same accounts and give a summary or synopsis of Christ's Galilean ministry. They were written about 65 or 80 A. D. According to some critics, they depend on some previously written account. Matthew, as a Jew, pictures Christ as a royal Messiah; Mark writes for the Gentiles and shows Christ's love for the poor and the outcast. All give Christ's talks in the simple speech of the common people, with parables giving directions for Christian living. The gospel of John contains an account of Christ's life in Judea and many events not given in the other three. Its date is about 90 A. D. The teachings of Christ are given in figurative language, with Jesus himself as the subject. Some critics account for this difference in the fact that John was more closely associated with Jesus and that the account given was of work in very different surroundings. See MATTHEW, SAINT; MARK, SAINT; LUKE, SAINT; JOHN, SAINT.

**Gos'samer**, delicate, silk-like threads that are seen floating in the air, especially during the autumn. They are really the threads which have been spun by small spiders and torn loose from the supports to which they were fastened. Sometimes these threads are blown over long distances.

**Gosse**, *gos*, PHILIP HENRY (1810-1888), a naturalist of English birth, who lived in various parts of the United States, Canada and England. Among his books are *Birds; Reptiles and Fishes*;

## Gotha

*Land and Sea*, and *A History of the Jews*. His son, Edmund William, born 1849, has written a number of popular works on literary topics.

**Gotha**, *go'tah*, a town of Germany, in the duchy of Saxe-Coburg-Gotha, capital of the duchy of Gotha. It is 14 mi. w. s. w. of Erfurt. It contains a museum, a picture gallery, a library of 200,000 volumes and a large collection of coins and medals. The manufactures consist chiefly of woolen goods, porcelain, musical instruments, soap, toys and shoes. Population in 1910, 39,553.

**Go'tham**, a name given by Washington Irving to New York City.

**Gothenburg**, *go'ten boorg*, or **Göteborg**, *yu'te boorg*, a seaport town in Sweden, second to Stockholm in population and trade. It is the capital of the län of the same name and is situated at the mouth of the Göta-Elf, in the Kattegat. Gothenburg is one of the best-built towns in Sweden and is the seat of a bishopric. It has manufactures of sail cloth, cotton and other goods and possesses shipbuilding yards, tobacco factories, breweries and sugar refineries. The trade is very extensive, the harbor being excellent and always free from ice. The town is noted for the system under which it licenses liquor-selling (See GOTHENBURG SYSTEM). Population in 1911, 170,606.

**Gothenburg System**, a method of regulating the sale of intoxicating liquors, adopted in Gothenburg, Sweden, in 1865. Under this system the monopoly of the traffic is given to a company which pays a tax for compensation. The dividends are limited to six per cent, additional profits being divided between the town, the agricultural society of the province and the general government. The result has been to diminish the sales, to separate the liquor problem from politics, to increase the purity of the liquor sold and to improve the character of the drinking-places. However, it has led to an increase in the sale of beer and to the private manufacture of other more injurious drinks.

**Goth'ic Architecture**. See ARCHITECTURE.

**Gothland**. See GOTLAND.

**Goths**, an ancient Teutonic tribe, occupying, when first known to history, the region adjacent to the Black Sea, north of the Danube. About the middle of the third century they began to encroach on the Roman Empire. In the fourth century the great Gothic kingdom extended from the Don to the Theiss and from the Black Sea to the Vistula and the Baltic. About the year 369 internal commotions produced the division of

## Gottschalk

the Gothic kingdom into the kingdom of the Ostrogoths (eastern Goths) and the kingdom of the Visigoths (western Goths). In 396 Alaric, king of the Visigoths, made an irruption into Greece, laid waste the Peloponnesus and became prefect of Illyria. He invaded Italy and sacked Rome in 409 and a second time in 410. After his death in 410 the Visigoths succeeded in establishing a new kingdom in the southern parts of Gaul and Spain, of which, toward the end of the fifth century, Provence, Languedoc and Catalonia were the principal provinces, and Toulouse was the seat of government. The last king, Roderick, died in 711 in battle against the Moors, who had crossed from Africa and who subsequently conquered the Gothic kingdom. After the fall of the Western Roman Empire, by the invasion of Odoacer in 476, the Eastern emperor Zeno persuaded Theodoric, king of the Ostrogoths, to invade Italy in 489. The Goth became king of Italy in 493 and laid the foundation of a new Ostrogothic kingdom, which came to an end in 554. Subsequently the Goths both here and in Spain entirely disappeared as a distinct people.

**Got'land** or **Gothland**, an island of the Baltic, 55 mi. e. of, and belonging to, Sweden. It is nearly 80 miles long and 35 miles wide at its widest part. It has a rocky, irregular coast and a high, limestone plateau, with fertile soil. Wisby, its chief town, was once a member of the Hanseatic League. Population in 1910, 55,219.

**Gottenburg**. See GOTHENBURG.

**Göttingen**, *gö'ting en*, a town of Prussia, in the Province of Hanover, on the Leine, 60 mi. s. s. e. of Hanover. It is a place of great antiquity. It is chiefly famous for its university, founded in 1734 by George II of England, elector of Hanover, and opened in 1737. The university has an average attendance of over 1000 students. Connected with the university are a museum, an observatory, an anatomical institute, a botanical garden and a library of over 500,000 printed volumes and 6000 manuscripts. The manufactures of Göttingen comprise woolens, chemicals, scientific instruments, leather goods, tobacco pipes and sausages. Population in 1910, 37,600.

**Gottschalk**, *goht'shahlk*, LOUIS MOREAU (1829-1869), an American musician, born in New Orleans, La. His marked musical ability induced his father to send him to Paris to receive further education, and later he appeared in concert in France, the United States and South America, with uniform success. He died in Cuba while on a concert tour. His compositions

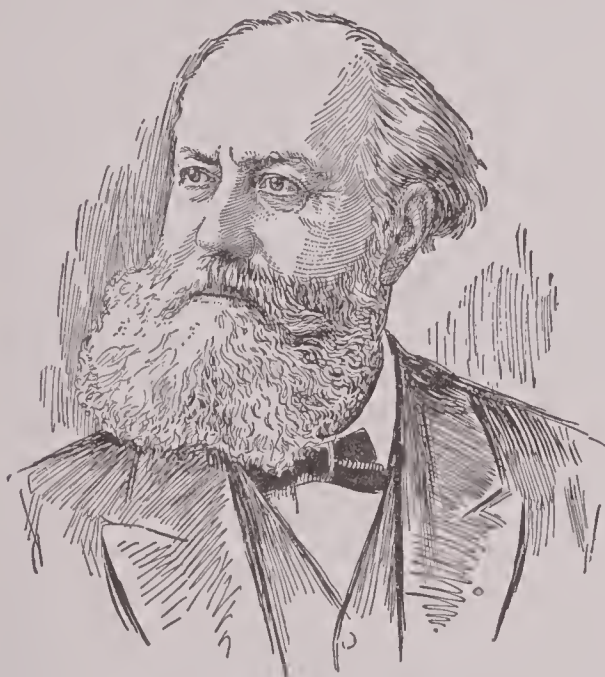


## Gouge

for the piano are numerous and well known, his masterpiece being *The Last Hope*.

**Gouge, gowj.** See CHISEL.

**Gough, gof.** JOHN BARTHOLOMEW (1817–1886), a temperance orator, born in England. He came to America when but a boy, worked on a farm in New York and afterward was for a time in a bookbindery in New York City. He lost his position through drinking, and for a time he earned a living by singing in saloons; but he was induced at last to sign a pledge, and from that time he spent years traveling about the country, lecturing on behalf of temperance reform. He attained a very wide reputation and gave his lectures several times in Europe. He published an *Autobiography*, a volume of sketches, *Sunlight and Shadow, or Gleamings from My Life Work*, and several volumes of lectures.



CHARLES FRANÇOIS GOUNOD

**Gould, goold,** GEORGE JAY (1864– ), an American capitalist, born at New York, the son of Jay Gould. He was privately educated, and when he became of age he assumed direction of many of his father's railroad and other commercial enterprises. Under his energetic management the Gould interests were vastly extended and embraced a total railroad mileage of more than twenty-one thousand miles, besides large holdings in the Western Union Telegraph Company, the Equitable Life Assurance Society, the Pacific Mail Steamship Company, numerous national banks and other corporations. The Gould railway interests include the Wabash, the Missouri Pacific, the Texas and Pacific and the St. Louis,

## Gourd

Iron Mountain & Southern. See RAILROAD.

**Gould, HELEN MILLER.** See SHEPARD, HELEN GOULD.

**Gould, JAY** (1836–1892) an American capitalist, born at Roxbury, N. Y. He began active life as a surveyor, and in 1856 he entered the tanning and lumber business. Later he bought railroad stocks, disposed of them at a great profit and in 1859 established himself as a broker in New York City. He gained control of the Erie Railroad when it was in financial distress, by means more original than honorable, and constantly added to his railroad holdings, until he owned more than one-ninth the railroad mileage of the country (1880). His usual method was to depress the value of the stock in the open market, and then to buy quickly. In this way he secured control of the Union Pacific and the Missouri Pacific at a time when their stocks were almost worthless and developed them into paying roads. He was also a prime mover in the consolidation of telegraph lines and in the founding of the Western Union Company. In 1869 he was interested with James Fisk in an attempt to "corner" the gold market. It resulted in "Black Friday," one of the most disastrous financial episodes in American history. He left a fortune estimated at \$70,000,000.

**Gounod, goo no',** CHARLES FRANÇOIS (1818–1893), a French composer, born at Paris. He studied at the Conservatoire and afterward in Italy, winning distinction for his compositions. His first important mature work was *Faust* (1856), which raised him to a high rank among composers. Other operas followed, among which *Romeo et Juliette* (1867) is the best. Gounod's study of church music during his stay in Rome emphasized the religious tendencies of his nature. To these he gave expression in *Saint Cecilia's Mass* and other sacred music. He wrote also a *Messe Solennelle*, a motet, *Gallia*, and other choral works and songs. *Saint Cecilia's Mass* and the oratorios *Redemption* (1882), *Mors et Vita* (Death and Life) (1885), exhibit Gounod's mastery of musical technique as well as his deep, spiritual feeling.

**Gourd, gord or goord,** the popular name for a family of plants, as well as for the typical genus of that order. The fruit of these plants is also known by the name gourd. The plants are large, with annual or perennial stems, trailing or climbing by tendrils, and large alternate leaves. The corolla is either yellow, white or green and sometimes is large and handsome. The fruit is fleshy and succulent. There are more than

## Gout

fifty genera and about three hundred known species of gourds, many of which are useful or remarkable. Among them are the squash, the melon, the cucumber, the pumpkin, the colocynth and the bryony. They are natives of both hemispheres, chiefly within the tropics, but the more valuable ones are now commonly cultivated in most parts of the world. On some species the outer coat, or rind, is so hard that bottles and water cups are made from the fruit.

**Gout**, *gout*, a constitutional disorder, giving rise to paroxysms of acute pain, with a specific form of inflammation, appearing chiefly in the male sex and returning after intervals. It is very often preceded by, or alternates with, disorder of the digestive organs. It seizes the patient usually at night, causing violent pains in the big toe or in the heel or calf of the leg. These pains last all night and are excruciating, especially if the patient moves or is jarred. A second night of pain is usually followed by sudden relief from pain, although swelling and fever remain in the limb. Similar attacks may occur at short intervals through a period of several weeks, or even months, the whole constituting what is commonly called a "fit of the gout." It may be acquired or hereditary. In the former case it rarely appears before the age of thirty-five; in the latter, it is frequently observed earlier. It appears that the disease is due to an excess of uric acid in the blood. Indolence, inactivity and too free use of sour wines, fermented liquors and very highly-seasoned and nitrogenous food are the principal causes. Strict regulation of the habits of life is one of the most important elements in the treatment of gout.

**Government**, *gub'urn ment*, a word used with various meanings, namely, to denote the act of governing, the persons who govern and the mode or system according to which the sovereign powers of a state—legislative, executive and judicial—are vested and exercised. In this last sense, government originated with the association of men in groups, or clans, its object from the beginning consisting in the establishment of justice, peace, security and liberty. In recent times difference of opinion has developed as to the real purpose and the extent of the functions of government. Some students believe that the activity of government should be confined to the fundamental and necessary functions of society as a whole, such as those mentioned above, considered in their narrowest sense. Others assert that the general welfare of the community should be promoted more directly

## Government

by government, through the extension of governmental function into such fields as the regulation of trade, manufactures and transportation.

Government receives its obedience primarily by reason of the force which it can exercise, but in modern times, in civilized communities, men have learned to obey government, not so much because of the actual coercive power which it possesses, as because of their realization that their best interests are closely bound to those of the state in which they live and of which they form a part. This force which induces obedience may be called the sanction of government; the former is the sanction of force; the latter, the sanction of reason.

By nature governments are of two kinds, autocratic or democratic. However, these two qualities may be blended in a particular form of government, so that in some of its activities it is controlled autocratically by one or few, while in others it is controlled wholly by the body of citizens. In form, governments are of three kinds; the *monarchy*, in which the governing power is vested in one individual; the *aristocracy*, in which a select portion of the community possesses all sovereignty, and the *republic*, in which sovereignty is retained by the whole community itself. However, in form, also, the classification of government cannot be perfectly or definitely made, since in some governments, such as that of England, though power nominally rests with the king, a single ruler, in reality it is diffused throughout the whole state, and the government is democratic in principle. Similarly, in some republics, such as the First Republic in France, power, though nominally in the hands of the people, is in reality exercised by a few or even one, and is oligarchical, or even monarchical, in principle.

Monarchical governments differ in their nature, being known as *absolute* or *limited*. Absolute monarchy exists when all the powers of legislation and execution are nominally centered in the hands of the monarch. Limited monarchy exists when the powers of legislation are shared with the persons forming the state. This may be done by the establishment of a constitution, either written or unwritten, framed by the people or their representatives or in accordance with their demands; or it may be done by the institution of a representative assembly whose powers are coördinate with those of the ruler. These two forms may be combined, the former being known as *constitutional government*, the latter as *representative*



*government*, the mixture as *constitutional representative government*. One of the interesting developments in government is that of the *federal state*, which is the association of several sovereign states into one central government, in which all have a voice and to which all owe allegiance. It differs from a so-called *confederation*, in that the states composing a federal state surrender certain powers of sovereignty to the central government, while in a confederation the constituent states retain all essential powers of sovereignty, delegating only certain powers to the central government, which powers may be withdrawn or changed at the will of any one state in the union (See STATE). For discussion of the forms of government in the important nations of the world see their several titles. See, also, CIVIL GOVERNMENT, Vol. V.

**Gov'ernor**, a contrivance in mills and machinery for maintaining a uniform velocity with a varying resistance. A common form of steam engine governor consists of a pair of balls, suspended from a vertical shaft, kept in motion by the engine. When the engine goes too fast, the balls fly farther asunder and depress the end of a lever, which partly shuts a throttle valve and diminishes the quantity of steam admitted into the cylinder; and on the other hand, when the engine goes too slowly, the balls fall down toward the spindle and elevate the valve, thus increasing the quantity of steam admitted into the cylinder. By this ingenious contrivance, the quantity of steam admitted to the cylinder is exactly proportioned to the resistance of the engine, and the velocity is kept constantly the same. A similar contrivance is frequently attached to the gate of a water wheel, to regulate the supply of water by raising and lowering the gate.

**Governor's Island**, a fortified island in Boston harbor, Massachusetts, belonging to Suffolk County. Its fortifications form part of the defense of the harbor. Upon it is Fort Winthrop, an enclosed fort with open batteries.

**Governor's Island**, an island in the New York harbor, near the end of Manhattan Island. It belongs to the United States and is used for naval and military purposes, being fortified by forts Columbus, Castle William and South Battery.

**Gow'er**, JOHN (about 1325-1408), an early English poet, a contemporary and friend of Chaucer. His chief works are *Speculum Meditantis*, *Vox Clamantis* and *Confessio Amantis*, of which the first was a moral tract relative to

the conjugal duties, written in French rhymes; the second a metrical chronicle of the insurrection of the commons under Richard II, in Latin elegaic verse, and the third an English poem in eight books, containing about thirty thousand lines, relative to the morals and metaphysics of love.

**Gozzoli**, *got'so le*, BENOZZO (1420-1498), an Italian painter, born at Florence. He was a pupil of Fra Angelico and worked at Florence, Rome, Orvieto and Pisa. His name is specially identified with the great series of mural paintings in the Campo Santo, at Pisa, consisting of twenty-four subjects from the Old Testament, among which are *Life of Noah* and *Visit of the Queen of Sheba to Solomon*.

**Gracchus**, *grak'us*, a Roman family of the Sempronian gens, several members of which became famous. TIBERIUS SEMPRONIUS GRACCHUS became consul in 177 B. C. and again in 163. He married Cornelia, a daughter of Scipio Africanus and was the father of the two most celebrated Gracchi, TIBERIUS SEMPRONIUS (about 163-133 B. C.) and CAIUS SEMPRONIUS (159-121 B. C.). The brothers lost their father early, but received from their mother, Cornelia, a careful education. In 133 B. C. Tiberius was elected to the tribuneship. His first efforts were directed to a reform of the Roman land system, by the restoration or enforcement of the old Licinian law, which enacted that no one should possess more than five hundred acres of the public lands and that the remainder should be equally divided among the plebeians. This law, which was called after him the Sempronian, he revived, but with the introduction of several softening clauses. He was violently opposed by the aristocracy and by the tribune Marcus Octavius, whose veto retarded the passage of the bill. Tiberius, however, by exerting all the prerogatives of his office, managed to pass his bill. But fortune turned against him; he was accused of having violated his office and of aspiring to be king, and at the next election for the tribuneship he was killed. Ten years after the death of Tiberius, the younger Gracchus obtained the tribuneship. In the discharge of his office he first of all renewed his brother's law and revenged his memory by expelling many of his most violent enemies from the city. Several popular measures gained him great favor with the people, but the intrigues of the nobles ultimately caused his fall.

**Grace**, DAYS OF, in commerce, a certain number of days allowed for the payment of a

## Graces

bill or note, after the day on which it becomes due on its face. In most states of the Union and Great Britain, the days of grace are three, the number of days allowable being determined by the law of the place where the instrument is payable. In other countries it varies from three to thirty. If the last day of grace is a bank holiday the instrument is payable on the next to the last day of grace.

**Graces**, *gra'sez*, in classical mythology, the goddesses of grace, daughters of Jupiter, from whom came everything beautiful and agreeable. According to most poets and mythologists, they were three in number, and Hesiod gives them the names of Aglaia (brilliancy), Thalia (the blooming) and Euphrosyne (mirth). Homer mentions them in the *Iliad* as attendants of Juno, but in the *Odyssey* they are spoken of as companions of Venus. He conceived them as forming a numerous troop of goddesses, whose office it was to render happy the days of the immortals. The three graces were usually represented slightly draped or entirely nude, locked in each other's embrace or hand in hand.

**Grack'le** or **Grak'le**, a genus of birds, of the starling family, inhabiting India and New Guinea. One species is the Indian *mina bird*, which can be taught amusing tricks and can imitate the human voice. A number of other birds in different parts of the world are called grackles. See CROW BLACKBIRD.

**Gra'dy**, HENRY WOODFIN (1851-1889), an American editor and author, born at Athens, Ga. He was educated at the University of Georgia and the University of Virginia. As editor and correspondent of various papers, he attracted attention for his articles on the South, and in 1882 he became managing editor and part owner of the *Atlanta Constitution*. He also won a reputation as a public speaker, especially on the theme "The New South."

**Grafting**, the art of propagating plants by inserting a bud or twig of one plant into the stock of another. The stem or branch into which the part is grafted is known as the *stock*, and the part inserted into the branch is called the *cion*; if the latter is a bud, it is known as the *bud*. There are various methods of grafting, known as budding, whip grafting, cleft grafting and crown grafting.

**BUDDING**. In budding, the bud from the axil of a leaf is inserted into the bark of a stock. The bud is prepared by cutting a shield-shaped section of bark, which usually includes a little of the wood, from the plant (See *b* in Fig. 1).

## Grafting

A piece of the leaf stock is left on the bark, to serve as a handle in inserting the bud. The stock is prepared by cutting a T-shaped slit in the bark (*a*, Fig. 1). The bark is then loosened from the corners where these cuts meet, and the bud is slipped under, being left in such a position that it protrudes from the cut just below where the vertical and cross sections meet. The stock is then wound with yarn or twine that will yield a little as the bud swells (*c*, Fig. 1).

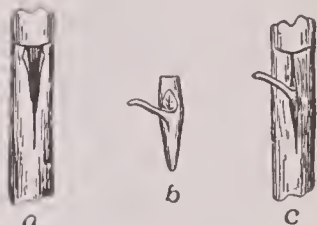


FIG. 1

below where the vertical and cross sections meet. The stock is then wound with yarn or twine that will yield a little as the bud swells (*c*, Fig. 1).

**WHIP GRAFTING**. In whip grafting the cion and stock are cut so as to have notches and tongues that will exactly fit into each other (*a* and *b*, Fig. 2). The success of this style of

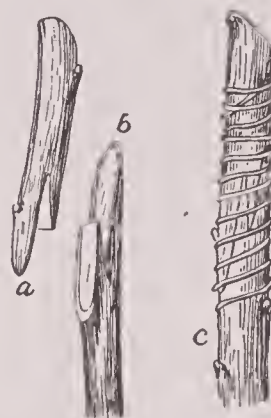


FIG. 2

grafting depends upon the cion and stock being of the same size. It is generally employed by nurserymen in the propagation of young trees. The prevailing practice is to cut the stock quite close to the root and graft a comparatively long cion upon it. The joint is wound and covered with wax or clay (*c*, Fig. 2). In the spring the plants are set so that the joint comes

just below the surface. As the plant grows, roots spring forth from the grafted cion, so that in a short time this part of the tree has roots of its own.

**CLEFT GRAFTING**. Cleft grafting is employed with trees that are too large for whip grafting.

The branch to be grafted is sawed off, then split through the middle. The cion has one edge sharpened wedge-shaped and is inserted in the cleft in such a way that the bark of the cion will meet that of the stock (*a* and *b* in Fig. 3). The wound is then covered with wax to exclude the air and moisture (*c* in Fig. 3).

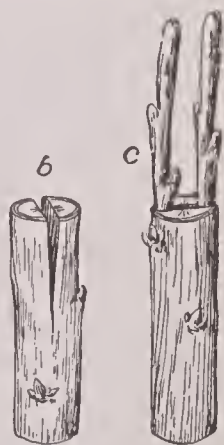


FIG. 3

**CROWN GRAFTING**. In very large limbs, crown grafting is sometimes used. This is done by



sawing off the branch as in cleft grafting, but instead of splitting the branch through the center the bark is loosened at two or three places and the wedge-shaped cion is inserted between the bark and the wood (a and b in Fig. 4).

Grafting is done upon the principle that the scion will reproduce its kind, regardless of the stock into which it is grafted, and upon the further principle that the sap, by a system of



FIG. 4

osmosis (See OSMOSIS), will pass from the stock into the cion. Only the most closely related species can be grafted on to each other with success. Usually plums and peaches can be grafted upon each other, as can apples and pears, but apple trees will not graft upon plum or cherry trees. Nurserymen employ grafting for the purpose of producing variety in plants and also to secure a hardy stock for the plant, as the stock into which the cion is grafted is usually that of a tree native to the locality and one that will withstand the exigencies of soil and climate better than the tree from which the cion was taken. Consult Bailey's *The Nursery Book*.

**Grafton, MASS.**, a village situated on the Blackstone River, 9 mi. s. e. of Worcester. It is of importance for its manufacture of boots and shoes, cotton goods and thread. Population in 1910, 5705.

**Grafton, N. D.**, the county-seat of Walsh co., 40 mi. n. of Grand Forks on the Park River and on the Great Northern and the Northern Pacific railroads. This city is in a vast wheat region, has an extensive trade in the county and also has stockyards, grain elevators, flour mills, machine shops and other factories. The state institute for feeble-minded is located here. Population in 1910, 2229.

**Grafton, W. VA.**, the county-seat of Taylor co., 82 mi. e. by n. of Parkersburg, on Tygarts Valley River. The city is the terminus of four divisions of the Baltimore & Ohio railroad and contains railroad shops, flour and planing mills, cigar factories and a number of wholesale houses. A national cemetery is located here, and the state reform school is at Pruntytown, 4 miles west of the town. Grafton was established as a railroad town in 1854 and was chartered as a city in 1899. Population in 1910, 7563.

**Graham, WILLIAM ALEXANDER** (1804–1875), an American politician, born in Lincoln co., N. C., educated at the University of North Carolina and admitted to the bar. He was elected to the state legislature in 1833 and was for a time speaker of the assembly. After serving a short term in the United States Senate, he was twice elected governor by the Whigs and was made secretary of the navy by President Fillmore, serving from 1850 until June, 1852. He was nominated for vice-president on the ticket with General Scott in 1852. Graham was for a time a member of the Confederate senate.

**Graham Land**, a tract of land in the Antarctic Ocean, discovered in 1832 by Biscoe, who took possession of it for Great Britain. See SOUTH POLAR EXPLORATION.

**Grail**, THE HOLY (spelled also *Greal* or *Graal*), the legendary vessel, supposed to have been of emerald, from which Christ dispensed the wine at the last supper and about which many legends centered. It was brought to England by the son of Joseph of Arimathea and was kept by his descendants for centuries, but was finally, owing to the sin of one of its keepers, taken back to heaven. The Grail was visible only to the pure of heart, or, according to other accounts, it struck blind all who looked upon it, except the pure. The legend of King Arthur became connected with the Grail stories, and many of his knights made quests in search of it. Three of them, Galahad, Perceval and Bors, had sight of it. The legends of the Grail have been used often as literary themes, and on the version which connects it with the Arthurian romance Tennyson based his *Holy Grail* in the *Idylls of the King*. Wagner's great music drama *Parsifal* is founded on a different version.

**Grain Elevator**, a building designed for the storage, handling and cleaning of grain. Elevators are located along the lines of railway or near docks. The most common ones have the form of a rectangular building, with high walls, surmounted by a cupola, which extends the entire length of the building and is from one to three stories high. The lower portion, or main part of the building, contains bins in which the grain is stored, while the cupola usually contains the machinery for weighing, moving and cleaning the grain, though in some buildings this is found in the basement or at one end of the main body of the building. The latest style of grain elevator consists of one or more cylindrical tanks, constructed of steel,

## Grains

tile or concrete. Since these structures are fire-proof, they are much more desirable than wooden buildings. Grain is unloaded from the cars or from the vessel into the elevators by structures known as *legs*, which are movable boxes containing endless belts, to which buckets are fastened at even intervals. The lower end of the leg is placed in the hold of the ship or at the door of the car, and grain is received into a hopper, from which it is fed to these buckets as the belt is moved by machinery. In this way grain can be unloaded into the elevator and moved from the bottom of the lowest bin to the top, where it can be weighed and cleaned and sent to various bins or to any destination desired. The largest of these buildings will hold over a million bushels of grain, and some of them have machinery which will admit of handling at least 400,000 bushels in a day.

**Grains**, the name of the fruits of several grasses, as corn, wheat, barley, oats and rye. They contain gluten, starch, a sweet mucilage, an aromatic substance in the hulls, and much moisture. Grains furnish one of the chief foods of man, being ground into meal and flour, which are included in most articles of diet. The term grain is also used to designate the plants themselves. The raising of grains is among the chief agricultural industries. The most productive regions are the valleys of great rivers, such as the Nile, the Po and the Ganges, in the Old World, and the Mississippi, in the New World. The prairie region of the United States is the greatest grain-producing region of the world. The most important grains are described under their respective titles. See INDUSTRIES in Volume VI.

**Grak'le**. See GRACKLE.

**Gram**, the unit of weight in the metric system, equal to about 15.4323 grains in the English system. A decagram, or ten grams, equals 5.644 drams; a hectogram (100 grams) equals 3.527 ounces; a kilogram (1000 grams) equals 2.205 pounds; a myriagram (10,000 grams) equals 22.046 pounds.

**Gramineae**, *gram min'e ee*. See GRASSES.

**Grammar**, the science of language, which treats of the words of which a language is composed and of the laws that govern their use. English grammar is generally discussed under four broad divisions: *orthography*, which treats of the proper spelling of words; *etymology*, which treats of the parts of speech and their inflections; *syntax*, which treats of the relations of words in sentences, and *prosody*, which treats

## Granada

of the laws of versification. *Comparative grammar* treats of the resemblances and differences of languages and of their relations, as the relation of the Anglo-Saxon to our present English tongue. See ENGLISH LANGUAGE.

**Gram'pians**, a range, or, rather, a series of ranges and elevated masses of mountains, stretching across Scotland diagonally, southwest to northeast, for about 150 miles. It commences in Argyleshire, and at the boundaries of Perthshire and Aberdeenshire may be said to separate into two distinct branches—one on the north side of the Dee, terminating near Huntly; the other running on the south side of that river, and terminating near Stonehaven. The Grampians comprise all the highest summits in Scotland—Ben Nevis, 4406 feet high; Ben Macdhui, 4296 feet high; Ben Cruachan, Ben Lomond, Cairngorm and Cairntoul.

**Gram'pus**, a name for several marine mammals, allied to the dolphins. One species lives in the Atlantic Ocean and North Sea and grows to the length of twenty-five feet. It is remarkably thick in proportion to its length. The color of the back is black, the belly is a snowy white and on each shoulder is a large, white spot. The grampus, which has a remarkably voracious appetite, feeds upon other animals.

**Granada**, *gra nah'da*, formerly a Moorish kingdom in Spain, bordering on the Mediterranean, including what is now three provinces, Granada, Almeria and Malaga. Its area was about 11,000 square miles. The olive and vine are extensively cultivated, and fruit is very abundant. The sugar cane thrives in some parts.



GRANADA

Silver, zinc, iron, lead and coal are mined in considerable quantities. Manufactures are few, consisting chiefly of textiles, chocolate and bricks. After long forming part of the kingdom of Cordova, Granada became a separate kingdom in 1235. In 1492 it passed into the possession of the Spaniards. Population in 1910, 1,362,925.

**Granada**, a city in the south of Spain, capital of the Province of Granada. The streets rise



## Grand Army of the Republic

picturesquely above one another, with a number of turrets and gilded cupolas, the whole being crowned by the Alhambra, or palace of the ancient Moorish kings (See ALHAMBRA, THE). In the background lie the Sierra Nevada, covered with snow. The streets, however, are narrow and irregular, and the buildings are inferior to those of many other towns in Spain. The town is partly built on two adjacent hills, between which the Darro flows, traversing the town and falling into the Genil, which flows outside the walls. The cathedral is an irregular but splendid building; the archbishop's palace and the mansion of the captain-general are also noteworthy, and the Generalife, the summer palace of the Moorish princes, is second in beauty and splendor only to the Alhambra. There are several fine plazas, gardens and promenades.

The city was founded by the Moors before 800, and from 1036 to 1234 it was included in the kingdom of Cordova. In 1235 it became the capital of the Moorish kingdom of Granada and attained almost matchless splendor. In 1491 it remained the last stronghold of the Moors in Spain, but was taken by the Spaniards under Ferdinand and Isabella in 1492. Its prosperity continued almost without diminution till 1610, when the decree expelling the Moors from all parts of Spain brought about the decline from which it has never recovered. Population in 1910, 77,425.

**Grand Army of the Republic**, a patriotic society, organized in Decatur, Ill., April 6, 1868. Its chief objects are to strengthen the fraternal spirit among the veterans of the Union armies in the Civil War, to perpetuate the memory of those who have died and to assist needy members and their widows and orphans. Any soldier or sailor of the Union army who served between April 12, 1861, and April 9, 1865, and who was honorably discharged, together with all members of state regiments who were subject to Federal officers, are admitted to membership. The society is organized into state and territorial departments, which in turn are supported by local societies, of which there are about seven thousand. In 1890 the membership was 409,487, but this number has since constantly decreased, until in 1911 it was 191,346. The annual deaths amount to about nine thousand. Annual meetings, called encampments, are held in the leading cities of the United States. The Grand Army has not directly entered politics, but it has in many cases influenced elections and action by Congress, especially with regard to matters affecting the pension laws. See WOMEN'S RELIEF CORPS.

## Grand Pre

**Grand Canyon of the Colorado.** See COLORADO RIVER.

**Grand Forks**, N. D., the county-seat of Grand Forks co., 80 mi. n. of Fargo, on the Red River of the North and on the Northern Pacific and the Great Northern railroads. This city is in an agricultural and lumbering region and has manufactures of flour, lumber and foundry products, woollens and other articles. There is also a large trade in live stock and farm produce. It is the seat of the University of North Dakota, Wesley College and the Saint Bernard's Academy. The place was settled in 1871 and was incorporated ten years later. Population in 1910, 12,478.

**Grand Ha'ven**, MICH., the county-seat of Ottawa co., 31 mi. w. of Grand Rapids, on Lake Michigan, at the mouth of the Grand River, and on the Pere Marquette and the Grand Trunk railroads. The city has an excellent harbor, is in a fruit- and celery-growing region and contains manufactures of refrigerators, furniture, lumber and other goods. Market gardening and fishing are also important industries. Akeley College for girls is located here, and the city has a public library and Highland Park. Grand Haven was settled in 1835. Population in 1910, 5856.

**Grand Island**, NEB., the county-seat of Hall co., 153 mi. w. of Omaha, on the Union Pacific, the Chicago, Burlington & Quincy and other railroads. The city is in a fertile agricultural region; it has an extensive grain trade, and the other industries include railroad shops, flour mills and beet-sugar, canning and broom factories. Grand Island College and the Nebraska Soldiers' and Sailors' Home are located here. The place was settled in 1869 and was incorporated three years later. Population in 1910, 10,326.

**Grand Jury.** See JURY AND TRIAL BY JURY.

**Grand Manan' or Grand Menan'**, an island off the coast of Maine, part of the County of Charlotte, New Brunswick. Its length is about 22 miles, and its average width is about 5 miles. It is important chiefly by reason of its valuable timber and the fishing stations about its coast. Population, about 2700. This population is noticeably increased during the summer, as the island is a popular summer resort.

**Grand Old Man**, a name popularly given to Gladstone.

**Grand Pre**, *grahN pray*, a beautiful village on the Basin of Minas, Kings co., Nova Scotia. The French settlers there were expelled by order of the English in 1713. It is of this incident that

## Grand Rapids

Longfellow's *Evangeline* tells, though not with historical accuracy.

**Grand Rapids**, MICH., the county-seat of Kent co., 60 mi. w. by n. of Lansing and 30 mi. e. of Lake Michigan, on the Grand River and on the Michigan Central, the Pere Marquette, the Grand Trunk, the Lake Shore & Michigan Southern and other railroads. It has a large public library, a number of hospitals, including Butterworth and Saint Mark's, and several other charitable institutions, among which are the Evangeline Home, Holland Union Benevolent Association Home and Saint John's Orphan Asylum. Other prominent buildings include the city hall, the courthouse, the Federal building, the Y. M. C. A., the Masonic Temple, Elks Temple, the filtration plant and a number of business blocks.

The region around Grand Rapids is devoted to agriculture and fruit growing and contains extensive gypsum quarries. The Grand River here has a fall of about 18 feet and furnishes considerable water power for manufacturing. Every kind of article coming under the general term of furniture is manufactured here. There are 55 furniture factories, and Grand Rapids is the largest producer in the world of show cases, carpet sweepers, refrigerators, manual training equipment and sticky fly-paper. The city was settled in 1833 on the site of an abandoned Indian village and was chartered in 1850. Population in 1910, 112,571.

**Grand Rapids** or **Greater Grand Rapids**, WIS., a city situated on the Wisconsin River 96 mi. w. of the city of Green Bay and on the Chicago, Milwaukee & Saint Paul, the Chicago & Northwestern, the Wisconsin Central and other railroads. The industries include saw mills and other lumber factories, foundries, machine shops, grist mills, large paper mills and wood-pulp mills. Population in 1910, 6521.

**Grand Remonstrance**, the name given to the document in which the English House of Commons presented to Charles I a statement of the grievances which they had against him. It enumerated all of the illegalities of his government, such as the levying of forced loans and the abuses of the courts of Star Chamber and High Commission. Charles attempted to put off the subject with an evasive answer. The insistence of the House on the Grand Remonstrance was the immediate cause of Charles's attempt to arrest five members of Parliament, which in its turn was one of the causes of the civil war in England.

## Granite

**Grand River**, a river of the United States, which rises in Grand Lake, Colorado, flows in a generally w. s. w. direction through a deep canyon and finally unites with the Green River in Utah to form the Colorado. Its total length is about 350 miles.

**Grandville**, *grahN veel'*, (1803-1847), a French caricaturist and book illustrator, whose real name was Jean Ignace Isidore Gérard. He was a contributor to *Le Charivari* and an illustrator of the works of Béranger and La Fontaine, of *Gulliver's Travels*, *Robinson Crusoe* and others. His works are carefully and accurately drawn and for this reason are sometimes hard and unexpressive.

**Grange**, *graynj*, (also called Patrons of Husbandry), a society or lodge of farmers in the United States, organized for the purpose of promoting the interests of agriculture; especially, for abolishing the restraints and burdens imposed on it by the commercial classes and the railroad companies and for doing away with middlemen. The influence of the Grange was important in the passage of several acts affecting the agricultural interests of the country, but they were also concerned in other legislation not of such excellence and eventually lost prestige, being largely absorbed by the Populist party.

**Granite**, an igneous rock (See IGNEOUS ROCKS), generally composed of quartz, feldspar and mica, mixed without any regular arrangement of the crystals. The grains vary in size from that of a pin's head to a mass of two or three feet in diameter, but they seldom exceed the size of a large pea. When the grains are of this size or larger, the granite is said to be coarse-grained. Granite varies in color from almost white to black and from light pink to dark red. This variation is due to the different proportions of feldspar and to the different colors which that mineral takes. Granite is one of the most abundant of the igneous rocks, and that seen upon the surface of the earth was thrown into its present position by the convulsions of the earth's crust. Most of the granite is of very early formation, but some varieties are of a later period. Granite is very hard, strong and durable and is one of the most valuable building stones. It can be worked into any form, receives a high polish and withstands the weather well. The most extensive granite works in the United States are in Maine, New Hampshire, Vermont, Massachusetts and Minnesota. Syenite is a variety of granite in which the mica is replaced by hornblende. It is often stronger and more durable than granite,



## Grant

and much of the granite of commerce is syenite, or syenitic gneiss (See GNEISS).

**Grant, FREDERICK DENT** (1850-1912), an American soldier, son of Ulysses S. Grant, born at Saint Louis, Mo. He graduated at West Point in 1871 and became lieutenant colonel in the United States army, but resigned in 1881. Afterwards he was minister of the United States to Austria, and later he was police commissioner of New York City. In the Spanish-American War he was appointed brigadier general of volunteers and for a time was in command in Porto Rico. He was transferred to the Philippines, where he performed notable service, in both civil and military capacities. In 1901 he was appointed brigadier general in the regular army and became commander, successively, of the departments of Texas, of the Lakes and of the East.

**Grant, ROBERT** (1852- ), an American lawyer, novelist and essayist, born in Boston. He was educated at Harvard University, received the degree of Doctor of Philosophy and also graduated from the law school. He became a successful lawyer and judge, but it is as an author that he will be best remembered. *The Lambs*, *The Little Tin God on Wheels* and *The Confessions of a Frivolous Girl* are interesting to young readers. *Unleavened Bread* and *The Undercurrent* are the best of his fiction. Besides his stories he has written several volumes of essays.

**Grant, ULYSSES SIMPSON** (1822-1885), an American soldier and statesman, the eighteenth president of the United States. He was born at Point Pleasant, Clermont County, Ohio, and was educated in the common schools and at West Point. His first name was originally Hiram, but in later life he abandoned its use and signed himself simply U. S. Grant. After graduating from the military academy he served during the Mexican War, taking part in every important battle except Buena Vista and being brevetted captain for gallantry. In 1854 he resigned his commission and engaged first in farming and the real estate business near Saint Louis, without success. He then went to Galena, Ill., where he became a clerk in his father's leather store.

On the declaration of war, in 1861, he offered his services to the Union, but received no reply and was chosen captain of a company of volunteers. He was soon promoted to a brigadier generalship of volunteers. He seized Paducah, completed preparations for the navigation of the Tennessee and the Ohio, blocked the departure of reinforcements from Belmont, captured Fort

## Grant

Henry and Fort Donelson and won the two days' Battle of Shiloh. He then gained a new victory at Iuka and, after repulsing the Confederates before Corinth, commenced operations against Vicksburg. After a siege of some months, in the course of which he took the town of Jackson and scattered an army under Johnston, Vicksburg surrendered. For this Grant was made major general in the regular army and was placed in command of the Mississippi division. After the defeat of Rosecrans at Chickamauga, he directed the great Battles of Chattanooga.



ULYSSES SIMPSON GRANT

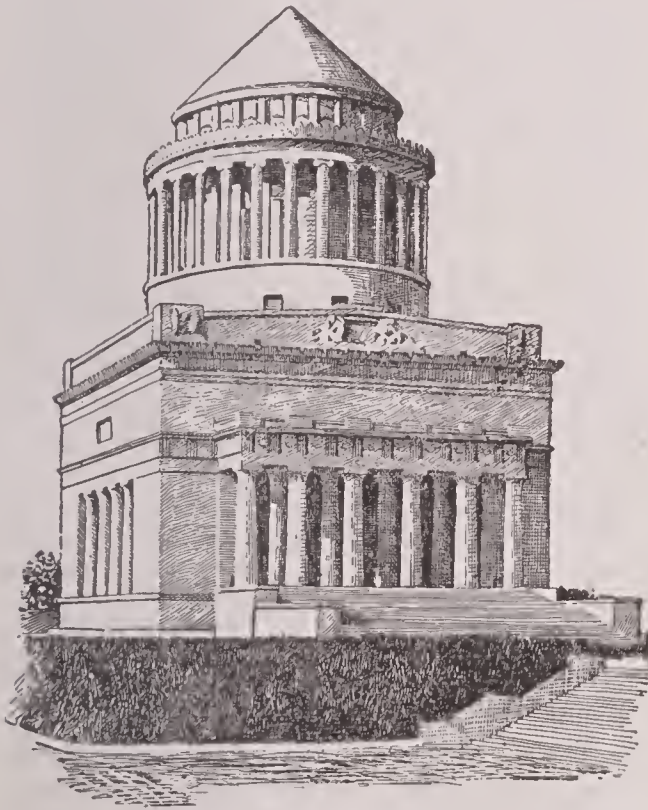
In March, 1864, he was appointed lieutenant general and assumed command of all the armies of the United States. He planned a simultaneous movement upon the part of the eastern and western Union armies, which resulted in the overthrow of the Confederacy. He himself, in a succession of hotly contested battles at the Wilderness, Spottsylvania, North Anna and Cold Harbor, steadily advanced on Petersburg and Richmond. After a siege of many months, these fell, and Lee, defeated at Five Forks and completely surrounded, surrendered to Grant, April 9, 1865.

Grant returned to Washington, and in 1866 he was made general of the armies of the United States. After exercising important influence during the presidency of Johnson, generally in his favor, Grant was himself elected president in 1868. His administration was noteworthy for the reduction of the national debt and for the settlement of the *Alabama* dispute with England.



## Grant

He was reelected in 1872. During his second term occurred the great panic of 1873 and the exposure of several official scandals, with none of which, however, he was personally connected. On his retirement he spent some time in travel, making a trip around the world. Later, he became involved in a company which exploited his name, failed and left him heavily in debt. He was candidate for the nomination of president before the National Republican convention at Chicago in 1880, but was unsuccessful. He endeavored to repair his fortune by writing and publishing his *Memoirs*, which he completed, after a heroic struggle, just before his death. The work was at once acclaimed as one of the most careful, complete and impartial descriptions of the Civil War, and it took high rank for its clearness, force and modesty as an autobiography.



GRANT'S TOMB  
Riverside Drive, New York City

The principal characteristics of Grant as a soldier were determination and persistence. By this means he brought the war to a close, but through these methods, also, he committed his greatest blunders, overestimating the importance of patience and force, as compared with ingenuity and foresight. As a man he endeared himself to all by his high ideals and unassuming manner. As president his natural generosity often led him into judgments of men which offset his own ability and honesty. But all in all, his was one

## Grape

of the most imposing personalities in American history. Consult Owen Wister's *Ulysses S. Grant* in the Beacon Biographies; Grant's *Personal Memoirs*; Wilson's *General Grant* in the Great Commanders series, and Church's *Ulysses S. Grant* in the Heroes of the Nations series.

**Granulation**, in surgery, the formation of little, grain-like, fleshy bodies on the surfaces of ulcers and running wounds, serving both to fill up the cavities and to bring their sides nearer together and unite them. The color of healthy granulations is a deep, florid red. Unhealthy livid granulations sometimes appear, and these are known as *proud flesh*.

**Granville**, *grahN veel'*, GEORGE LEVESON-GOWER, Second Earl (1815-1891), an English statesman. In 1855 he became chancellor of the duchy of Lancaster, president of the council and ministerial leader of the House of Lords; and in 1856 he represented the British crown at the coronation of Czar Alexander. From 1859 to 1866 he was again president of the council. In 1868 he was colonial secretary under Gladstone, and he was later foreign secretary, a post which he held until 1874. On the return of Gladstone to office in 1880, Lord Granville again became foreign secretary.

**Grape**, the fruit of a vine which grows both in the wild state and under cultivation. There are many varieties of both wild and cultivated grapes, and the vines are found in all continents. The grape has a woody stem, which climbs by attaching itself to supports by means of tendrils; it has a dark brown bark, resembling that of a tree. The leaves are large, broad and deeply three-lobed. The blossoms are small and of a greenish color. The fruit grows in clusters, is spherical or oval and varies in size from one-fourth of an inch to an inch indiameter, while in color it may be green, yellow, red, purple or variegated. The interior is a soft pulp, containing two or five seeds, and the outer skin is tough and indigestible, but it contains an acid which in cooking adds flavor.

Wild grapes are propagated by seeds, but the cultivated varieties are propagated by cuttings or graftings (See GRAFTING). The methods of propagation, pruning and cultivating vary in different regions. The grape is extensively cultivated in western Asia, the south of Europe and in certain portions of the United States, particularly in New Jersey, Delaware, New York, Ohio and Illinois in the eastern half of the country, and California in the western portion. The vine lives for a long time, and in favorable climates it



## Grape Fruit

will produce for many years. The fruit is chiefly used for raisins and for the manufacture of wine, though most of the grapes grown in the United States east of the Mississippi River are placed on the market for table use.

The grape is supposed to be the oldest cultivated fruit, and it has been known to civilized nations from time immemorial. It is supposed that the Phoenicians introduced the plant into Europe, whence it spread to England. Grape culture in California was begun by the Spanish missionaries about 1771, and from this small beginning the industry there has attained its present proportions. See RAISINS; WINE.

**Grapefruit**, also called pomelo, a citrus fruit allied to the lemon and the orange, but called grapefruit because of its slightly grape-like taste and because the fruit grows in small clusters somewhat like bunches of grapes. All varieties were originally called shaddock, from a Captain Shaddock who found the fruit in the East



BRANCH WITH BUNCH OF GRAPEFRUIT

Indies and introduced it into England about 1810, but the term shaddock is now properly applied only to the long, pear-shaped kinds, while the grapefruit or pomelo should mean only the round and orange-shaped.

The fruit is a native of southeastern Asia, but is now widely grown in Florida and other tropical or semi-tropical regions. The average grapefruit of commerce weighs from eight ounces to a pound, but under favorable conditions the fruits frequently attain a weight of eight to twelve pounds. The pulp of the fruit resembles that of the orange, except that it is coarser. The juice is sour and a little bitter, but is very pleasing if a little sugar is added. Some varieties of the shaddock, however, are so acid that they are not edible; the natives in the West Indies

## Grasses

and other regions use the juice for scrubbing floors because it drives away the insects. The commercial varieties have been greatly improved by grafting and crossbreeding. Florida produces each year about \$2,000,000 worth, over 95 per cent of the total for the United States, California producing nearly all the remainder.

**Graphite**, *graf'ite*, one of the forms under which carbon occurs in nature, also known under the names of *plumbago* and *black lead*. It occurs frequently as a mineral production and is found in great purity in Borrowdale, in Cumberland, England, and in large quantities in Canada, Ceylon, Bohemia and at Ticonderoga, N. Y., where that of the purest quality is found. Graphite may be heated to any extent in close vessels without change; it is practically unchangeable in the air; it has an iron-gray color, metallic luster and granular texture, and it is soft and soapy to the touch. It is used chiefly in the manufacture of pencils, crucibles and portable furnaces; in burnishing iron to protect it from rust; for coating wax or other impressions of objects designed to be electrotyped, and for counteracting friction in machinery.

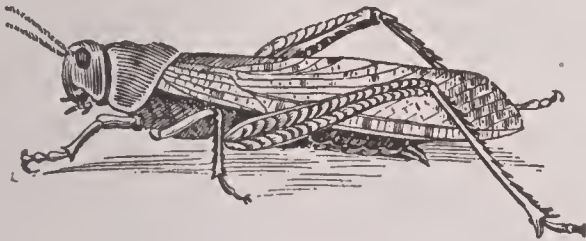
**Grass'es**, the common name of a very extensive and important family of plants, comprising about 250 genera and 4500 species, including many of the most valuable pasture plants, as well as corn, nearly all the grains, sugar cane, bamboo and many others. While technically all these plants belong to the grass family, yet the name is commonly applied only to the pasture grasses, as distinct from the cereals, and, moreover, to some plants which are not, in a strict sense, grasses. Most of the grasses are small herbs, with narrow sheathing leaves. The flowers, which are small, are never conspicuous, but they are often grouped in pretty and graceful clusters. The typical flower has three stamens, each with a long, delicate anther attached near the middle, so that it moves freely on its support, and a single pistil with a two- or three-branch stigma. These organs are surrounded by delicate bracts; several flowers are grouped into a spikelet, and these are in turn gathered into the racemes, panicles or heads which characterize the species. The fruit is a grain and usually is rich in food material. Most of the hay that is used is made from grasses, though clover and other plants are used for fodder. The direct and indirect products of the grass family are almost innumerable, and it is difficult to get an adequate idea of the great importance of this family. A great number of special articles will be found



## Grasshopper

upon leading grasses, such as CORN; WHEAT; RYE.

**Grass'hopper**, the name of various leaping insects which are nearly related to the locusts. They are characterized by long and slender legs, the thighs of the hinder legs being large and adapted for leaping, by large and delicate wings and by the peculiar wing covers, which extend far beyond the extremity of the abdomen. Grasshoppers form an extensive group of insects and



GRASSHOPPER

are distinguished by the power which they possess of leaping to a considerable distance and by the chirping noise the males produce by rubbing their wing covers together. The destructive insect known as the grasshopper in the United States is the Rocky Mountain locust, and the "locust" of this country is really the cicada. See LOCUST; CICADA.

**Grass Tree**, the popular name of a genus of Australian plants of the lily family, having shrubby stems, with tufts of long, grass-like, wiry foliage, from the center of which arise the tall flower stalks. These sometimes reach the height of fifteen or twenty feet and bear dense cylindrical spikes of blossoms at their summit. The base of the leaves forms, when roasted, an agreeable article of diet, and the leaves themselves are used as fodder for all kinds of cattle.

**Gratian**, *gra'she an*, (359-383), Roman emperor, eldest son of the emperor Valentinian I. When only eight years of age he was raised by his father to the rank of Augustus. On the death of Valentinian, in 375, the Eastern Empire remained subject to Valens, and Gratian was obliged to share the western part with his half-brother, Valentinian II, then four years old. In 378, on the death of Valens, he succeeded to the Eastern Empire, which he bestowed on Theodosius I. He was deserted by his soldiers while leading them against Maximus, and was put to death at Lyons.

**Grat'tan**, HENRY (1746-1820), an Irish orator and statesman, educated at Trinity College and at the Middle Temple and called to the Irish bar in 1772. In 1775 he was elected member for Charlemont in the Parliament of Ireland.

## Gravity

He brought forward resolutions asserting the Crown to be the only link between Britain and Ireland, and in 1782 he led the volunteer movement, which was instrumental in securing the concession of virtual independence to Ireland. In 1800 he strongly opposed the union with England, but on the passage of Pitt's measure he was returned to the imperial Parliament. He worked constantly for Catholic emancipation.

**Gratz** or **Graz**, *grahts*, a town of Austria-Hungary, capital of Styria, picturesquely situated on the Mur, about 140 mi. s. w. of Vienna. The Schlossberg, or citadel, rises 400 feet above the river, but the fortifications of the town have given place to avenues and pleasure grounds. The university, founded in 1586, has almost two thousand students and a library of over 150,000 volumes. The Joanneum, for the promotion of agriculture and scientific education, has a large library and museums. The manufactures consist of woolen, cotton and silk tissues, machinery, steel rails, wagons, soap, leather and ironware. Population in 1910, 151,781.

**Graver**. See BURIN.

**Grav'ita'tion**, the attraction which exists between all bodies at sensible distances. The general law of gravitation, discovered by Newton, is that every portion of matter attracts every other portion of matter with a force directly proportional to the product of their masses and inversely proportional to the square of the distance between them. *Gravity* denotes the attraction which the earth exerts on bodies on its surface. This attraction is least at the equator and greatest at the poles, since, owing to the form of the earth, bodies at the equator are a little farther from the center than at the poles. Furthermore, the rotation of the earth, being so rapid at the equator, has a tendency to throw bodies from the surface and thus to overcome in a measure the earth's attraction, while at the poles this tendency is not found. For the laws of gravity, see FALLING BODIES.

**Gravity**, **SPECIFIC**, the relative weight or density of substances. Specific gravity is found by comparing the weight of a substance with the weight of an equal quantity of some other substance, taken as a standard. Water forms this standard for liquids and solids, and air is the standard for gases. There are three general rules for finding the specific gravity of substances:

(1) *To find the specific gravity of a body heavier than water*, attach the body to one arm of a balance or to a spring balance and weigh it in air; then weigh it suspended in water. Its



## Gray

loss of weight in water is equal to the weight of an equal volume of water. Subtract the weight in water from the weight in air and divide the weight in air by the difference. The result is the specific gravity.

(2) *To find the specific gravity of a body lighter than water*, weigh the body in air; then weigh a sinker in air, being sure that the sinker is heavy enough to immerse the light body. Weigh the sinker in water, and then weigh the two in water. From the loss of weight of the two bodies in water subtract the loss of weight of the sinker in water. The result will be the loss of the light body. Divide the weight of the light body by its loss of weight in water, and the result is the specific gravity.

(3) *To find the specific gravity of a liquid*, use a specific gravity bottle, which holds a certain weight of water, as a thousand grains. Divide the weight of the liquid which the bottle contains by the weight of the water, and the result is the specific gravity. The specific gravity of liquids may also be found by the use of the hydrometer (See HYDROMETER).

**Gray, ASA** (1810-1888), an American botanist, born at Paris, N. Y. After practicing medicine for some time, he became assistant to Professor Torrey in the New York College of Physicians and Surgeons. In 1842 he was appointed Fisher professor of natural history in Harvard University and held the chair for thirty-one years, when he retired from its more active duties. Gray was one of the ablest and the most philosophic of botanists and wrote many valuable books, among which are *Lessons in Botany*, *Elements of Botany*, *How Plants Grow*, besides other botanical text-books. He was one of the first American scientists to advocate the theory of evolution and set forth his theories in *Darwinia* and *Free Examination of Darwin's Treatise*. At the time of his death he was the leading American authority in the science of botany.

**Gray, ELISHA** (1835-1900), an American inventor, born at Barnesville, Ohio. He experimented in the construction of electrical machines and in 1867 took out his first patent. He applied, in 1876, for a patent on a telephone, which was refused on the ground that Alexander Graham Bell had applied for a patent on a similar invention on the same day and was adjudged to have a prior claim. For the next few years Gray was engaged in perfecting and patenting telegraph instruments and details of telegraphic structure. Among his inven-

## Gray

tions were a system of multiplex telegraphy, a type-printing telegraph and the telautograph, a form of writing- or copying-telegraph. See TELEGRAPH; TELAUTOGRAPH.

**Gray, GEORGE** (1840- ), an American jurist, born at New Castle, Del. He graduated at Princeton, studied law at Harvard and was admitted to the bar in 1863. He began practice at New Castle, but later removed to Wilmington. From 1879 to 1885 he was attorney-general of Delaware and in the latter year was elected United States senator as a Democrat, serving until 1899, when he was made judge of the United States circuit court. He was a member of the Spanish-American peace commission of 1898 and of the joint high commission between Canada and the United States in the same year. He was also chosen a member of the permanent court of arbitration of the Hague Convention in 1900 and was chairman of the anthracite coal strike commission in 1902.

**Gray, JOHN PURDUE** (1825-1886), an American physician, born in Pennsylvania, noted for his work among the insane, especially in the states of New York and Michigan. He was instrumental not only in securing better treatment for patients, but in the founding of many charitable institutions, including hospitals and asylums. He died from the effects of a wound received at the hands of a lunatic.

**Gray, ROBERT** (1757?-1806), an American naval officer and discoverer, born at Tiverton, R. I. In 1787 he commanded a vessel in an expedition to the northwestern coast of America and to China. Later he returned home by way of the Cape of Good Hope, being the first American to sail completely around the globe. Upon his discovery of the Columbia River in 1788 the American claim to the Oregon region was afterward based.

**Gray, THOMAS** (1716-1771), an English poet, born in London, educated at Eton and Cambridge. In 1738 he was entered at the Inner Temple, but accompanied Horace Walpole, a school friend, on a tour of Europe, until they quarreled in Italy. He returned to England in 1741 and on the death of his father took up his residence at Cambridge. In 1747 appeared his *Ode on a Distant Prospect of Eton College*, which won him a wide reputation, but it was not until the publication of his *Elegy Written in a Country Churchyard*, four years later, that he became famous. In 1757 he declined an offer of the laureateship, and in the same year he published his odes, *The Progress of Poesy* and *The Bard*.

## Grayling

From 1768 to his death he was professor of modern history and languages. Among Gray's other works are *Ode for Music*, *Ode to Spring* and *Hymn to Adversity*. In Latin verse he is surpassed by few, and his letters are most admirable.

**Gray'ling**, a name given to a family of fishes related to the salmon. They are more slender, however, have larger scales and are more graceful and active, resembling the trout in their habits. Graylings are fine game fish, and their flesh is considered a great delicacy. The com-



GRAYLING

mon European species is found in Scandinavia, Russia, the Orkney Islands and as far south as Switzerland. The largest specimens weigh four or five pounds. In America, graylings weighing about a pound and a half are found in the clear, cold streams of Canada, Alaska, Michigan and Montana.

**Graz, grahts.** See GRATZ.

**Great Bar'ington**, MASS., a town in Berkshire co., 40 mi. w. of Holyoke, on the New York, New Haven & Hartford railroad. It is surrounded by picturesque mountain scenery and is a popular summer resort. There are manufactures of cotton goods, electrical apparatus, paper and other articles. The city has a public library, the Hopkins Memorial Manse and the Sedgwick Institute. It was settled in 1725, but remained a part of Sheffield until 1761. Population in 1910, 5926.

**Great Bear Lake.** See BEAR LAKE, GREAT.

**Great Brit'ain**, geographically, the largest island of Europe, consisting of the political divisions England, Scotland and Wales; officially, the United Kingdom of Great Britain and Ireland, and popularly, the term used for the British Empire. This article treats of the island Great Britain and the Empire as a whole. For detailed descriptions of surface, manufactures, cities and inhabitants, see ENGLAND; IRELAND; SCOTLAND; WALES. Great Britain lies between the 50th and 59th parallels of north latitude and is separated from Europe by the North Sea, the English Channel and the Strait of Dover. Its

## Great Britain

greatest length from north to south is 608 miles. Its breadth varies from 32 miles, in the narrowest point, to 320, in the widest. The area of the island is 88,094 square miles, and of the United Kingdom, 121,000 square miles, or about three times that of the State of Ohio. The coast is very irregular and contains many deep indentations, so that the coast line exceeds 4000 miles in extent, or 1 mile for every 20 square miles of area.

**SURFACE AND DRAINAGE.** The surface of Great Britain is divided into four well-defined regions: (1) the highland region of the north, which is separated from the lowlands, to the southeast, by an irregular line, drawn from the mouth of the Clyde around Loch Lomond to the mouth of the Dee and separating the Grampian Mountains, which form the principal group in the highlands, from the South Grampians; (2) a region of lowlands to the southeast of this line, extending to the ranges of mountains in the southern portion of Scotland; (3) the mountain region, extending from the southern part of Scotland through the northern and western part of England and into Wales, this region containing a number of low mountain ranges, whose greatest height does not exceed 2600 feet, and one of which ranges, the Cheviot Hills, forms a large portion of the boundary between England and Scotland; (4) the lowlands or plains occupying the southeastern portion of the island and including the greater part of the surface of England. None of the mountains of Great Britain are high, and the highest peak, Ben Nevis, to the west of the center of Scotland, has an altitude of only 4406 feet.

Because of the area of the island and the numerous mountain ranges, none of the rivers are of great length or volume. The two largest streams are the Clyde and the Severn, each of which flows through a longitudinal valley for some distance before reaching the sea. Because of the basins drained, these streams acquire considerable volume. The most important rivers entering the sea upon the east are the Spey, the Don, the Dee, the Tay, the Forth, the Tweed, the Tyne, the Trent and the Thames. The last is commercially of great importance, since it has been made navigable by dredging and is the waterway which affords an outlet to the commerce of London. In the mountain regions in the north are numerous small, clear lakes, noted for their beauty and for the purity of their water. Among these are Loch Lomond, Loch Katrine and Loch Rannoch.



## Great Britain

**CLIMATE.** If Great Britain were placed alongside of North America, in corresponding latitude, it would extend from the northern shore of the Gulf of Saint Lawrence almost to the southern extremity of Greenland; yet, notwithstanding its latitude, the island has a mild, temperate climate, the average temperature for the year being about 48°. July is the warmest month, with an average temperature in London of 64°, and January is the coldest month. During the summer the mean temperature varies considerably from north to south, being a number of degrees lower in northern Scotland than in southern England; but in winter the change in temperature occurs from east to west, the temperature rising as one proceeds westward. In general, the rainfall is heaviest on the west coast and on the islands lying to the west of the main island, where the average is about 40 inches per year, very uniformly distributed. In certain localities in Great Britain, especially the western slope of the Scottish highlands, it is nearly double this amount. In Wales and Cornwall it exceeds 60 inches, but along the east coast it seldom reaches 30 inches. The island is subject to dense fogs and many dull, cloudy days.

This peculiarity of climate is due to the influence of the warm waters in the Atlantic. The warm drift, which starts off the east coast of North America as the Gulf Stream (See GULF STREAM), raises the temperature of the air which strikes Great Britain as a southwest wind. Since this wind blows during the greater part of the year, it gives to the island a mild and equable climate. During the winter months the coldest weather is produced by the north and northeast winds, which at this season of the year are more frequent than at any other time.

**VEGETATION AND ANIMALS.** See EUROPE, subheads *Vegetation* and *Animal Life*.

**INDUSTRIES.** The chief industries of Great Britain are agriculture, manufacturing, mining and commerce. For each of these the island is especially adapted by its geographical conditions. The mild and equable climate, with abundance of moisture, affords excellent conditions for agriculture, and wherever the land is tillable this is practiced with greatest success. In the highland regions the raising of live stock constitutes an important industry. Iron and coal are found in the highland districts in large quantities, and it is to the presence of these minerals that Great Britain owes its prominence as a

## Great Britain

manufacturing and commercial nation. Tin has been mined in Cornwall for centuries, and that locality is still an important source of supply. The leading industry is manufacturing. This employs a larger number of people than any of the other industries, and the value of its output exceeds that of any other. First in importance in manufactures are textiles, Great Britain being the leading country of the world in the production of cotton and woolen goods. Next in importance are iron and steel and all of the products arising from them. For detailed accounts, see ENGLAND and SCOTLAND, subheads *Agriculture* and *Manufactures*.

**TRANSPORTATION AND COMMERCE.** Throughout the island there are excellent highways. All of the principal towns are connected by railway lines, which are constructed and operated upon the most approved plans. The large cities contain street car lines, and in some localities these have been extended to connect neighboring towns. The island has over 3000 miles of canals, the most important of these being the Manchester Ship Canal and the Caledonian Canal, each of which is described under its title. Many of the rivers have also been canalized, so that they afford water communication between the inland towns and the sea. None of the manufacturing or commercial centers is more than 75 miles from the sea, and most of them are much nearer, while many are situated on waterways. These local advantages, combined with the extensive manufacturing industries and the position of Great Britain among the land masses of the world, have made her the foremost commercial and carrying nation. Trade has also been increased by the numerous colonies of the British Empire, with which special trade relations are maintained. The British merchant marine is the largest in the world, and carries not only the commerce of Great Britain but much of that of the United States and other nations as well (See MERCHANT MARINE). With the exception of the United States, no other country has ever risen to such commercial prominence as that held by Great Britain since the beginning of the eighteenth century. The exports consist almost entirely of manufactures, though coal is sent to other European countries. The imports consist of food products and raw materials. The annual foreign trade amounts to about \$6,650,000,000. Of this \$3,800,000,000 are imports and \$2,850,000,000 are exports. The leading countries engaged in the foreign trade, in the order

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of their importance, are the United States, Germany, France and Russia. England early adopted the policy of free trade, that is, of admitting goods from foreign nations without duty, and she has always been the foremost advocate of this policy among the nations. See **TARIFF**.

The money system employed is based upon the pound sterling, which as a unit of value holds a position similar to that of the dollar in the United States. Its value in United States money is usually \$4.8665, but rates of exchange cause this to vary slightly from time to time.

**RELIGION.** The Church of England is the established church in England, and the Presbyterian, or Church of Scotland, in Scotland. All other religions, however, are tolerated without opposition, and the Roman Catholic Church and leading Protestant denominations have large followings. See **ENGLAND, CHURCH OF**.

**EDUCATION.** See **EDUCATION, NATIONAL SYSTEMS OF**, subhead *Great Britain*.

**ARMY AND NAVY.** See **ARMY**, subhead *British Army*; **NAVY**, subhead *Great Britain*.

**THE EMPIRE.** The British Empire is the largest in the world and includes over one-seventh of the land area and nearly one-fourth of the population of the earth. British possessions are found upon every continent and in every clime. The colonial policy of the government allows the greatest possible freedom to the inhabitants of these possessions; all of the leading colonies are self-governing, and such as Canada and Australia are practically independent (See **CANADA, DOMINION OF**; **AUSTRALIA, COMMONWEALTH OF**). The chief colonial possessions, with the area and population in 1911, are shown in the table on this page. Those of comparatively no importance are omitted, and the population of such colonies as British East Africa and others that are not well known is estimated.

**GOVERNMENT.** *Central.* The government of Great Britain is a constitutional hereditary monarchy. Its constitution, however, is not a single written instrument, but consists of all the laws of Parliament, all royal decrees establishing forms or principles of administration, a number of important agreements, several treaties, by which the relations of the parts of the United Kingdom to one another are regulated, and a vast mass of precedents and judicial decisions. Of all these, five instruments are, perhaps, of the greatest importance: the Magna Charta, given by King John in 1215; the

# Great Britain

GREAT BRITAIN AND ITS COLONIAL POSSESSIONS	AREA IN SQUARE MILES	POPULATION
<b>IN EUROPE:</b>		
United Kingdom.....	121,089	45,216,665
Isle of Man.....	227	52,034
Jersey and Guernsey.....	76	96,900
Gibraltar.....	2	24,460
Malta.....	117	228,442
<b>IN ASIA:</b>		
India (British and Native States).....	1,766,542	244,267,542
Ceylon.....	25,333	3,592,397
Cyprus.....	3,584	274,108
Hong Kong.....	32	366,145
Aden, Perim and Kuria Muria.....	101	46,165
Sokotra.....	1,382	12,000
Bahrein Islands.....	270	70,000
Borneo (British North)....	31,106	200,000
Labuan Island.....	31	6,546
Brunei.....	4,000	21,718
Sarawak.....	41,000	500,000
Straits Settlements (Singapore, Penang and Malacca).....	1,542	714,069
Federated Malay States (Perak, etc.).....	26,380	1,035,933
Wei-Hai-Wei (in Shantung)	285	150,000
<b>IN AFRICA:</b>		
Ascension Island.....	35	400
Basutoland.....	10,293	405,600
Bechuanaland Protectorate.	275,000	125,350
Cape of Good Hope.....	277,000	2,563,024
Central Africa Protectorate (British).....	40,980	1,000,000
East Africa (British, Uganda and Zanzibar).....	289,258	4,000,000
Mauritius and dependencies	877	400,000
Natal (including Zululand, Amatongland and other districts).....	35,371	1,191,958
Nigeria.....	310,000	17,000,000
Orange Free State.....	50,392	526,906
Rhodesia.....	750,000	1,700,000
Saint Helena.....	47	3,520
Seychelles.....	148	26,000
Somaliland Protectorate..	60,000	300,000
Transvaal.....	111,196	1,676,611
West African Colonies (Gold Coast, Lagos, Gambia, Sierra Leone).....	138,260	1,716,000
<b>IN AMERICA:</b>		
Bermudas.....	18	18,994
Canada.....	3,729,665	7,204,527
Falkland Islands and South Georgia.....	7,500	2,272
Guiana (British).....	90,500	296,000
Honduras, British.....	7,562	40,458
Newfoundland.....	40,200	237,500
Labrador.....	120,000	4,000
<b>WEST INDIES:</b>		
Bahamas.....	5,450	55,944
Barbados.....	166	171,982
Jamaica and dependencies..	4,424	831,383
Leeward Islands (Virgin Islands, etc.).....	701	127,189
Trinidad (including Tobago).....	1,868	330,074
Windward Islands.....	498	120,000
<b>IN AUSTRALASIA:</b>		
Australia, Commonwealth of.....	2,972,918	4,455,005
British New Guinea.....	90,540	271,000
New Zealand.....	104,751	1,008,468
Fiji.....	7,435	139,541
<b>PACIFIC ISLANDS:</b>		
Tonga, or Friendly Islands.	390	23,737
Other Islands.....	9,000	200,000
Total.....	11,565,642*	345,048,567

\* This is considerably less than the actual total, owing to the omission of many minor possessions, and the conservative areas given for unsurveyed African territories.



Declaration of Rights in 1689; the Act of Settlement in 1701; the Act of Union with Scotland in 1707; the Act of Union with Ireland in 1800. The constitution obviously may be changed in a great number of ways; and, in fact, it is constantly changing.

The *executive* power is nominally vested in the Crown. This descends to the eldest child of the preceding ruler, male heirs being preferred over female heirs. The heir to the throne is admitted to full possession of his titles at the age of eighteen, when he becomes, by heredity, duke of Cornwall, and by grant, prince of Wales. The ruler must be a communicant of the Established, or Episcopal, Church. The Crown has all powers not expressly forbidden to it by Parliament. Thus, it may declare war, make treaties and appoint and remove a vast number of administrative officers; it has command of the army, with the power of appointment and removal, is the nominal head of the Church, and presides over the highest ecclesiastical bodies, has the power of granting pardon and of issuing passports. The ruler may also summon, open, prorogue and dissolve Parliament, though the last step is never taken except with the advice of his ministry. He also has the nominal power of vetoing the legislation of Parliament, but this right has not been used since 1707. Since the fundamental doctrine of sovereignty prevailing in Great Britain is that "the king can do no wrong," he is made absolutely irresponsible; therefore, he acts invariably through a ministry, which is directly responsible to Parliament.

The *ministry*, known as the *cabinet*, is entirely an extra-legal body, but it is, nevertheless, the most important factor in the government. It is formed as follows: The king asks the leader of the majority party in the house of Commons to become premier and to select a ministry. This leader, after consultation with his party colleagues, names a number of them whom he wishes to be appointed to the important cabinet positions. The king promptly appoints them. The members of this ministry may be members of either house of Parliament, but if they have seats in the House of Commons they must resign and come before their constituents for reelection; however, this is usually a mere formality. The members of the ministry not only have seats in Parliament, with full privileges, but they initiate practically every important measure of legislation and lead in the debates. If defeated on an important policy, the cabinet resigns.

If the members believe that the people will uphold them, they may request the king to order a new election; if defeated by the electorate, however, they must resign unconditionally. The members of the cabinet vary from eleven to twenty. Each member is at the head of an important administrative department. The eleven officers who are always members of the cabinet are the first lord of the treasury (usually the prime minister); the chancellor of the exchequer (the highest financial officer of the government); the lord chancellor (a judicial officer whose functions will be enumerated later); the lord president of the council (who is the presiding officer of the privy council; the lord privy seal (whose only duty is to affix the great seal of state to public documents); the first lord of the admiralty (who is at the head of the naval board) and the five secretaries of state—for foreign affairs, for the colonies, for war, for the home department and for India. Besides these, the following are often members of the cabinet, as at present: the chief secretary of Ireland, the secretary for Scotland, the president of the local government board, the commissioner of works, the president of the board of trade (which has charge of the public telegraph and commercial business, as well as the postoffice), the president of the board of agriculture, the postmaster-general, the attorney general and the chancellor of the duchy of Lancaster. The heads of departments may take the most important steps without consulting Parliament. Parliament may punish them for their acts, but it has no power to restrain them from doing whatever they see fit.

The *legislative* branch of the government consists of two houses, the House of Lords and the House of Commons. Their powers are about equal, except that all bills relating to taxation and appropriations must originate in the House of Commons; and every law requires the assent of both. The Parliament Act of 1911, however, provided that a bill which has passed, without change, three readings in three successive sessions of the Commons may become a law without the assent of the Lords. Each term of Parliament extends over five years, unless the body is sooner dissolved. The upper house consists of representatives of two estates, the lords spiritual and the lords temporal. Of the former, the archbishops of Canterbury and of York and twenty-four principal bishops are admitted. Of the lords temporal, there are about five hundred hereditary English peers, which have

been created by the Crown. This number may be increased without limit by the sovereign. Besides these there are sixteen Scottish peers, chosen by the whole body of Scottish peers to represent them during a term of Parliament, and twenty-eight Irish peers, chosen for life, by the whole body of Irish peers. There are also four judicial members, chosen from the privy council. The whole body is presided over by the lord high chancellor. The House of Commons consists of 670 members, chosen by a suffrage limited to male citizens who are twenty-one years of age or over and who possess a property qualification. Members of the House of Commons are chosen by districts, one representative being admitted for each 54,000 inhabitants. There are also a few representatives of towns and of the great universities. Members of Parliament need not be residents of the districts from which they are elected.

The House of Lords is the highest *judicial* body in the United Kingdom. It not only has original jurisdiction in certain instances, but it is the highest court of appeal for England, Scotland and Ireland. In hearing appeals, however, only the lord chancellor, the four judicial members and other members who have held high judicial positions are allowed to take part. There is also a judicial committee of the privy council, consisting, however, of about the same personnel as the House of Lords when sitting as a court of appeal. This committee hears appeals from the colonies and possessions. Besides these two courts, there is a high court of justice, which consists of three divisions, the chancery division, the king's bench division and the probate, divorce and admiralty division. Appeals lie from this court to a court of appeals consisting of eight judges. Criminal cases are within the jurisdiction of the justices of the peace and of so-called assize courts, held quarterly in certain towns by judges of the king's bench.

*Local.* Local government in England is extremely complex and in many respects unsystematic. By the acts of 1888 and 1894, however, the system has been somewhat simplified. There are six administrative units, namely, counties, boroughs, urban districts, rural districts, parishes and school districts. The officers of the *county* are a lord lieutenant, a sheriff, justices of the peace, a clerk and a coroner. The lord lieutenant represents the Crown; the sheriff and justices of the peace have duties similar to those of the same officers in the United States. How-

ever, the justices also have a few administrative duties, such as the issuance of licenses and appointing overseers of the poor. Each county also has a county council, consisting of councilors and aldermen, the latter being selected by the former, usually from their own members. This body administers county property, selects minor officers, assesses taxes, manages roads, grants amusement licenses, controls the police and has other administrative duties. The counties are subdivided into *rural* and *urban districts*, each governed by a council elected by the assemblies of still smaller districts, or parishes, and has administration of the poor laws, health laws and some other ordinances. The *parish* is governed by an assembly at which every voter and married woman has the right to vote. A rural parish having more than three hundred population also has a council, which has charge of charities, water supply and similar matters. The *borough* is an incorporated town; its officers are a mayor, aldermen and councilors, which together form the council. The councilors are elected by the taxpayers; the aldermen by the councilors, and the mayor by the whole council. The duties of these officers include all the important administrative functions. *London* is governed by a special provision of the Act of 1888, amended in 1901, by which it was made into an administrative county, containing 29 boroughs, each having the same officers as other boroughs (See LONDON). All phases of local government are supervised by a local government board, whose president is a member of the cabinet. It audits the accounts of all local authorities, institutes important local legislation and directs in a large measure the activities of local affairs.

*Administration in Scotland, Wales and Ireland.* The administration of government affairs in Scotland is conducted through the chief secretary for Scotland, who is usually a member of the cabinet. The country is represented in the Parliament of Great Britain by 16 peers and 72 commoners. In local government it conforms to the laws that are in force in England (See above). It has a separate system of civil and criminal courts, though an appeal to the House of Lords, the highest court in the United Kingdom, may always be taken.

Until the passage of the Government of Ireland Bill in 1914, Ireland was governed through a lord lieutenant and a privy council. The former was and still remains a personal representative of the Crown; he was always dependent upon, though nominally superior to, the chief secretary for



Ireland. The law of 1914 provides for an Irish parliament, besides allowing Ireland a small representation in the imperial parliament. It provides a separate system of courts, of which the highest is the supreme court of judicature; from this an appeal lies to the House of Lords of the United Kingdom. Local government is administered in accordance with a special act passed in 1898, but it generally conforms to the English system. All local government is supervised by a local government board, appointed by the lord lieutenant. See HOME RULE.

Wales since 1536 has been governed as a part of England, its inhabitants having all the rights and privileges of English subjects.

*Colonial Administration.* The colonies and dependencies which are united under the crown of Great Britain all are subject to the imperial Parliament. The *first* class comprises those which are practically independent of Great Britain, having their own legislature and judiciary and being subject to the crown only through its representatives, or governors, and through its nominal right to veto legislation. This right is used, in fact, only in rare cases, in matters affecting the Empire as a whole. Such colonies are Canada, Newfoundland, Australia and South Africa. The *second* class comprises the semi-independent colonies, in which the legislature is partly elective and partly appointed by representatives of the Crown, and in which the royal governor has greater influence. Such are Malta, Cyprus, Ceylon, Jamaica and others. The *third* class are the strictly-called Crown colonies, which are ruled entirely by a governor and council appointed by the Crown. This class includes the Empire of India, Gibraltar, the Straits Settlements, Orange River Colony, Transvaal, Gold Coast, British Honduras and others. The *fourth* class embraces the protectorates, that is, those colonies in which the government is conducted through native agencies. In point of fact, these are governed almost as completely by Great Britain as are the Crown colonies. The *fifth* class was formerly much more important than at present, comprising those colonies governed through trading companies by charters. Another class might with some justice be constituted, to include such territories as Egypt, where, though the government is nominally administered by another power (Turkey), British influence is so paramount that the country is practically a British dependency. (For details concerning the governments of the important colonies, see articles under their titles.)

FINANCE. The ordinary sources of revenue of Great Britain are seven in number, being, in the order of the amounts produced, as follows: excise duties, customs duties, income tax, inheritance tax, or so-called death duties, stamp duties, house duties and land tax. For a half century the tendency of British financial legislation has been towards free trade, though the fiscal system still retains the protective principle, inasmuch as duties are laid upon many manufactured products of which the raw materials are admitted free. They are chiefly, however, levied upon products not produced in England, such as tea, tobacco and sugar. The income tax is levied in graduated rates upon all incomes over £160; it constituted about one-sixth of the total revenue in 1911. The house duty is levied according to the rental value of the property, houses producing less than £20 annual rent being exempt. Local taxes are assessed by several boards, including the county councils and the school boards, and they are usually levied upon all property. The chief expenditures of the Empire are for the following purposes, the list being given in the order of the amounts required: the navy; interest upon the national debt; the army; the civil service; elementary education; contributions to supplement local taxation; the royal civil list, that is, the expenses and bounties for the royal family, and the collection of taxes. The national debt in 1911 amounted to £733,072,610 (\$3,665,000,000), requiring an annual payment of interest of £28,000,000 (\$136,200,000). The government owns the telegraph lines, the income from which is usually a trifle more than the expenditure; but from the postal service, which includes a parcel post, the government derives a net income of from four to five million pounds annually.

HISTORY. Although with the accession of James VI of Scotland to the throne of England as James I, in 1603, the crowns of the two countries had been united, each had retained its own legislative body; but by 1707 the feeling had grown strong that the best interests of the two countries demanded a complete political union. In May of that year, therefore, they were united under the name of Great Britain. (For the history of the two countries previous to the union, see ENGLAND, subhead *History*; SCOTLAND, subhead *History*.) For a time the union was not generally popular in Scotland, but gradually the realization grew that it was the best thing which could have happened.

Queen Anne died in 1714 and was succeeded

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by George I of the House of Hanover (See **GEORGE I**). Soon after his accession, risings occurred in the interests of the exiled Stuarts, whose cause the Tories had advocated with Anne, and the new Parliament found itself obliged to punish severely the leaders of these insurrections, which were easily put down. The Whig party, which came in with George, remained in power for almost fifty years. One of the first acts of the new Parliament was the passage of the Septennial Act, by which Parliament extended the term of its members in office to seven years. This arbitrary act was made possible by the fact that George I cared little for his English possessions, provided only the English were willing to support him in his plans on the Continent. This same indifference rendered possible the establishment of the first real cabinet government under a prime minister. Walpole, although he did not assume the title, was in reality the first of the premiers. In 1720 occurred the disastrous failure of the famous South Sea Company, which involved thousands in its ruin and greatly embarrassed the British government. Walpole's signal financial ability worked some sort of order in this crisis, however (See **SOUTH SEA COMPANY**; **WALPOLE, ROBERT**).

George I died in 1727 and was succeeded by his son, George II. Walpole retained his supremacy, since George II, like his father, took no vital interest in affairs in England. Against his will Walpole was drawn by popular feeling in 1739 into a war with Spain, which brought no honor to England and much unjust blame to him. Three years later, however, he resigned rather than engage in the War of the Austrian Succession. His successor, Carteret, at once involved the country in the war, and, although Great Britain won some victories, she came out of the struggle with no permanent advantages. During this war another Stuart rising had occurred, headed by Charles Edward, known as the Young Pretender, and this proved more formidable than the earlier attempts. Charles Edward was defeated, however, at Culloden and was forced to flee from the country. William Pitt entered the cabinet in 1756, and his hostility to France led him to engage at once in the war against France which ended so fortunately for England in India and in America (See **CLIVE, ROBERT**; **SEVEN YEARS' WAR**; **FRENCH AND INDIAN WARS**. For further events in the reign of George II, see **GEORGE II**; **PITT, WILLIAM**).

Meanwhile, before the close of the struggle with France, George II had died (1760) and had

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been succeeded by his grandson, George III. The new king adopted a different attitude toward English affairs and showed himself from the first determined to regain the royal prerogatives which had been lost by his two predecessors. As before the days of Walpole, the most important man in the cabinet became the man who happened to be the greatest favorite with the king (See **GEORGE III**); and Pitt resigned in 1761 and was succeeded by Bute, who in his turn gave place to North. During the North ministry, matters in America came to a crisis, and the result was the loss to England of much of her territory in North America (See **NORTH, FREDERICK, LORD**; **REVOLUTIONARY WAR IN AMERICA**). In the year which saw the close of this struggle (1783), the Younger Pitt was made prime minister, and until his death in 1806 he was at the head of affairs in England. In 1793 he declared war against France, not because of any harm which had been done to England, but simply because of his opposition to the fanatic republicanism of the French Revolution, and this war was prosecuted vigorously. The victory of Trafalgar (See **NELSON, HORATIO**) established the English supremacy on the sea, and Wellington's defeat of the French in Spain and Portugal enabled England to obtain favorable terms for herself at the Congress of Vienna.

During the war with France there had been an insurrection in Ireland, which was put down without great difficulty, and a war with the United States (See **WAR OF 1812**), which had ended somewhat less favorably than the struggle with France. These wars had increased enormously the national debt of England, and the distress was great among the lower classes. Most severe measures were taken to suppress the discontent of the working classes, but by the time of the death of George III in 1820 it had become apparent that matters could not be amended without radical governmental reforms. Thus, when in 1822 George Canning became a member of the cabinet of George IV as foreign minister, he turned his attention at once to reform and succeeded in carrying through several minor measures which improved the conditions of the country. He was made premier in 1827, but died soon afterward and was succeeded by Wellington. Wellington, although a Tory, carried on the reform movement, and in 1828 the Test Act was repealed (See **RUSSELL, LORD JOHN**). As a result of the Irish agitation under O'Connell in the following year, the ministry was also forced to agree to Catholic emancipa-



## Great Britain

tion. William IV, when he came to the throne in 1830, found himself confronted with the necessity for further reforms, and two years later he was compelled by Grey to agree to the creation of a number of peers, to make possible the passage of the Great Reform Bill of 1832 (See GREY, CHARLES). The next noteworthy measure was the abolition of slavery in the colonies in 1833.

In 1837 Victoria succeeded to the throne. During her reign matters remained largely in the hands of the ministry, and the sovereign exercised little real political influence. (See VICTORIA, and the articles on the statesman mentioned in that article; also BRIGHT, JOHN, and COBDEN, RICHARD.) A distinctive achievement of her reign was the suppression of the Sepoy mutiny of 1857, which ended in the transfer of the authority in India from the East India Company to the crown. The question of home rule for Ireland, the federation of the Australian colonies and the war against the Boers are also noteworthy.

The reign of Edward VII (1901-1910) was marked by the king's activity in political affairs, both at home and abroad, by the close of the war in South Africa and by the growth of a strong feeling of loyalty throughout the British Empire (See CHAMBERLAIN, JOSEPH; EDWARD VII; SOUTH AFRICAN WAR; TRANSVAAL COLONY). The political situation in England was complicated by the refusal of the House of Lords to pass the budget of 1909, providing for a greatly increased tax on land. The unexpected death of King Edward on May 6, 1910, caused a truce, which was brought to a close by the final passing of the bill, the new king, George V, giving it his approval. The most momentous legislation since the Reform Bill of 1832 was passed in 1911—the so-called Veto Bill, which denied the House of Lords the right to amend or reject any financial bill and provided that any bill which has been passed three times by the House of Commons in three successive years and three times rejected by the House of Lords may become a law without the approval of the Lords. The reign of King George was marked by the Imperial Conference of 1911, in which statesmen from the colonies met with those of Great Britain to discuss matters relating to the whole empire; the passage of an act providing for government insurance against sickness and unemployment; strikes and disturbances among the laboring classes; the disestablishment of the Welsh church, and the passage of the Home Rule Bill (See HOME RULE).

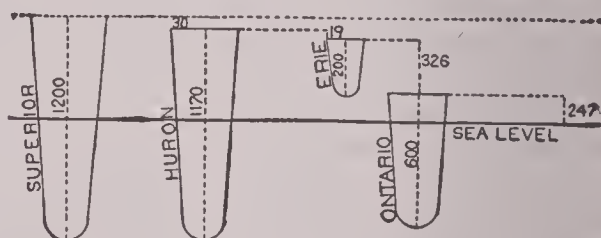
## Great Lakes

In 1914 Great Britain declared war against Germany, because of that country's violation of Belgian neutrality. See AUSTRIA-HUNGARY, subhead HISTORY; WAR OF THE NATIONS.

**Great Falls, MONT.**, the county-seat of Cascade co., 98 mi. n. e. of Helena, on the Missouri River and the Great Northern and other railroads. Gold, silver, copper, lead, iron and coal are found in the vicinity, and there are large smelting works. The important manufactures are flour, furniture, woollens, mining and agricultural implements. Population in 1910, 13,948.

**Great Kanawha**, *ka naw'wah*, a river of West Virginia, which rises between the Blue Ridge and Iron Mountains in North Carolina. It flows in a northeasterly direction, as the New River, through the western part of Virginia, and then, flowing to the northwest, traverses several ridges of the Alleghanies. The Gauley River flows into the Great Kanawha in Fayette County, West Virginia. The total length of the Great Kanawha is 400 miles, and it is navigable up to the Kanawha Falls, a distance of about 100 miles.

**Great Lakes, THE**, several vast inland bodies of water in the northern part of the United States, comprising Lake Superior, Lake Michigan, Lake Huron, Lake Erie and Lake Ontario. Lake Superior has an elevation of 600 feet above sea



level, while the elevation of Lake Ontario is only 247 feet. The fall of Lake Superior to Lake Huron is about 30 feet; of Lake Huron to Lake Erie, about 19 feet, and of Lake Erie to Lake Ontario, 326 feet. The accompanying diagram shows the relative position and altitude of the four lakes which form a continuous chain, their depth and their height above sea level. The level of Lake Michigan is about the same as that of Lake Huron. No large river flows into the Great Lakes. The Saint Lawrence River is the outlet. These inland seas constitute the largest body of fresh water in the world, covering an area of over 94,500 square miles, exceeding the combined area of Illinois and Indiana, and almost equalling that of Oregon.

The Great Lakes are the key to the modern industrial and commercial progress of the United States. More than half of the vessels registered

## Great Pedee River

in the United States are found upon the Great Lakes. On their shores are the richest farms, forests and mines in the country, and in the southern and western region of Lake Superior there are valuable mines of iron ore. There are twenty ports on the Great Lakes, the most important of which are Duluth, Milwaukee, Chicago, Detroit, Toledo, Cleveland and Buffalo.

The lake and river routes are extended greatly by means of canals, first of which is the Erie Canal, from Buffalo to Albany in New York (See **ERIE CANAL**). The Sault Sainte Marie is another canal of importance. This canal allows boats to pass from Lake Superior into Saint Mary's River and thus connects with the lower lakes (See **SAULT SAINTE MARIE CANAL**). Other canals are the Welland, which connects Lake Erie with Lake Ontario and passes around the falls in the Niagara River (See **WELLAND CANAL**), and the system of canals around the rapids in the Saint Lawrence. Canals have also been constructed connecting Lake Erie with the Wabash and Ohio rivers, passing through the State of Ohio by way of Columbus and Cincinnati.

The Great Lakes are valuable for their fisheries, which amount to almost \$4,500,000 every year, herring, white fish and trout being the leading species. For further information on the Great Lakes, see separate article on each lake.

**Great Pedee' River**, a name applied to the Yadkin River after it enters South Carolina. It rises in North Carolina in the Blue Ridge and flows in a southeasterly direction. Its affluents are the Little Pedee and Waccamaw, and it flows into the Winyaw Bay at Georgetown.

**Great Salt Lake**, a lake in Utah, 4000 feet above sea level. It is 70 miles long and 48 miles wide. Five gallons of its water yield, by evaporation, fourteen pints of salt. It has several islands, which, like its shores, are whitened by the salt. The chief tributaries are the Bear, the Jordan and the Weber rivers. This lake contains no fish, but has several species of insects and a brine shrimp, and it is frequented by immense flocks of gulls, ducks, geese and swans.

**Great Slave Lake**, an extensive lake in Canada, in the Territory of Mackenzie. It is about 300 miles long and 50 miles wide. On the north are rugged and steep shores, and in the lake are many islands. It receives the surplus waters of lakes Aylmer and Artillery, on the north, and those of Lake Athabasca, by way of the Great Slave River, on the south.

**Great Wall of China**, the largest artificial structure on the face of the earth, constituting

## Greece

the most extensive fortification in the world. It extends for about 1255 miles along the north limit of China proper, of which it partly forms the boundary, and varies from 20 to 25 feet in width. Its western end is in the deserts of Central Asia; its eastern end reaches the sea, northeast of Peking. The wall is thick enough for six horsemen to ride abreast over it. It is built of hewn stone or brick, filled in between with earth. It is said to have taken several million men ten years to complete it. It was erected as a barrier against the inroads of the barbarous tribes during the reign of Emperor Shi-Hwang-Ti, and it is supposed to have been completed about 210 B. C.

**Grebe**, *grebe*, a water bird whose feet are not webbed, but whose toes are bordered by a wide membrane. The legs are thin, flat and blade-like. When the birds are on land, they sit erect and are exceedingly awkward and unwieldy in their movements, but in the water they are excellent swimmers and divers and are very graceful. There are nine species known in the United States, of which the common grebe, or, as it is sometimes called, the *hell diver*, is the most common. The *crested grebe* is a larger bird, having beautiful silvery breast plumage. Unfortunately, this fine, close, silky plumage became fashionable for muffs and trimmings, and so many of the birds are killed every year to satisfy the demands of women that there is danger that the species will become extinct.

**Greece**, *grees*, a kingdom which occupies the southern part of the most eastern peninsula of Europe. It lies between the Aegean and the Ionian seas and between 40° and 36° 23' north latitude. Its greatest length is about 250 mi., its greatest width about 180 mi., and the total area, including the islands in the Aegean and Ionian seas, is about 25,014 sq. mi. The entire country may be divided into three parts: Northern Greece, or Epirus and Thessaly, which forms the most compact land mass; Central Greece, and the southern peninsula, called the Peloponnesus, which is connected with Central Greece only by the narrow Isthmus of Corinth.

**SURFACE AND DRAINAGE.** Considering the size of the peninsula, Greece has a very extensive coast line, on account of its numerous bays and gulfs. On the north, it is protected by the Cambunian Mountains, a range running from east to west. The eastern extremity of this range is the celebrated Olympus, supposed in



ancient mythology to be the dwelling place of the gods. The Pindus Mountains, which divide Greece into a large western and a smaller eastern portion, as far south as the Gulf of Corinth, form the principal water divide. Thessaly is separated from the rest of Greece by Mount Oeta, which protected Middle Greece from invasion as long as the few mountain passes were well guarded. The mountains of Greece which have special historical associations are Olympus, which has already been mentioned; Parnassus, which is sixteen miles north of Corinth and was the fabled home of the Muses; Ossa and Pelion, south of Olympus near the coast, and Hymettus and Pentelicus, near Athens, the former noted for its honey, the latter for its marble quarries. The Peloponnesus is broken up by chains of mountains which spread out in all directions from the central state of Arcadia. The mountainous character of the country had a strong influence on its history, as it tended to keep the states separate and prevented the formation of a central government.

The rivers of Greece, on account of the peculiar formation of the surface of the country, are of little importance. Most of them have short courses and rapid falls and are therefore not navigable. Many of them dry up in the summer and form rushing brooks in the winter. The most important of the rivers are the Ache-  
 lous and, in the Peloponnesus, the Alpheus and the Iri (Eurotas). Lakes are numerous in the mountain regions. The numerous islands by which Greece is surrounded belong to it by virtue of their physical and geographical structure. They are all mountainous and were probably at one time part of the mainland, Euboea appearing to be but a prolongation of the mountainous coast of Thessaly.

**CLIMATE.** The climate of Greece is in the main temperate and healthy, although it varies so greatly in different parts of the country that it is almost impossible to make any general statement regarding it. For example, at the same season of the year, at points not widely separated, may be found the heat of summer, the warmth of spring and the severity of winter. As in many other Mediterranean countries, the sirocco has a most unfortunate effect on the climate at certain seasons of the year (See **SIROCCO**). Apparently, in ancient times Greece was more healthful than it is to-day.

**MINERAL RESOURCES.** The minerals of Greece are neither numerous nor of great importance. The fact that there is no coal

interferes with the working of the copper and iron fields, but considerable lead is mined each year. Sulphur is found in some of the volcanic islands, and gypsum and salt appear in a number of localities. Paros and Pentelicus have long been famous for their marbles.

**INDUSTRIES.** The soil of Greece is thin, and agriculture is consequently backward, only about one-seventh of the area of the country being under cultivation. Irrigation is necessary to the production of good crops in almost all parts of the country. The vegetable products vary greatly with different localities, but a large part of the tilled land is given up to cereals. Despite this fact, however, Greece does not produce enough wheat for home use. The currant, a small seedless grape, which is grown largely on some of the islands in the Ionian Sea, is one of the largest and most important crops. Vineyards are numerous, but the wine produced is of poor quality.

The manufactures are unimportant. Wool-ens, chemicals, silks, cotton, pottery, soaps and leather goods are produced in sufficient quantities for home use, and shipbuilding is carried on at the seaports.

**TRANSPORTATION.** The position of Greece, together with its numerous bays and islands, has made of the Greeks at all times a seafaring people. The grain trade of the Black Sea and the Mediterranean Sea is almost all carried on by Greek merchants, and hundreds of vessels are employed for commercial purposes. The canal across the Isthmus of Corinth, completed in 1893, is a most important feature in Greek commercial life. The railroads of the country are not yet adequate to the demands upon them, as in 1900 there were only 603 miles in operation. There is in process of construction, however, a railroad between Athens and northern Thessaly, which will form the center of the transportation system of the country. Until comparatively recent times there were very few roads which could be used for carriages, but the means of communication have been greatly improved, and there are now over 2000 miles of good roads.

**INHABITANTS AND LANGUAGE.** Of the population of Greece, about nine-tenths are Greeks, the remainder being largely Albanians. Only about one-third of the Greek people live in Greece itself, and Turkey has almost as many Greek inhabitants as has the Greek kingdom. The language spoken is largely the modern Greek, which bears a very close resemblance to clas-

sical Greek, differing in fact from the Attic little more than the classical Attic and Doric dialects differed from each other. See GREEK LANGUAGE.

EDUCATION. For the early systems of education employed in Greece, see EDUCATION, HISTORY OF, subhead *The Ancient Classic Nations*. A modern law in Greece requires all children between five and twelve to attend school, but this law is by no means universally enforced, and illiteracy is very common, especially in the rural districts. From the primary schools to the university, all institutions of learning are free. The University of Athens is the chief higher institution of learning, and it had in 1900 almost 3000 students.

LITERATURE. See LITERATURE, subhead *Greek Literature*.

ART AND ARCHITECTURE. See PAINTING, subhead *Ancient Period*; SCULPTURE, subhead *Greece*; ARCHITECTURE, subhead *Greek Architecture*.

GOVERNMENT AND RELIGION. The government of Greece is an hereditary constitutional monarchy. Originally there were two houses in the Greek legislature, a Senate and a House of Representatives, but on the accession of George I, in 1864, the Senate was abolished, and the sole legislative power now rests with the House of Representatives, which is known as the *Boule*. Suffrage is universal, and elections are by ballot. A ministry, consisting of the heads of the six departments of state, exercises under the king the executive functions.

The predominant religion is the orthodox Greek faith, and nine-tenths of the people are of this religion. The king is required, unless a special exception is made, to be a member of this Church, and he is recognized as its temporal head. The affairs of the Church are managed by a permanent synod, which meets at Athens.

CITIES. The chief cities of Greece are Athens, the capital; Piraeus, the port of Athens; Patras, and Corfu, each of which is described under its title.

HISTORY. When Greek history begins, both coasts of the Aegean are occupied by Indo-Germanic peoples. The Greeks themselves did not know much about the relations of their ancestors with the original inhabitants of Greece. The people who were thought by the Greeks to have been the original inhabitants were called Pelasgians. However, they were as good Greeks as the Greeks proper. They had lived originally in Thessaly, where they were in constant

warfare with their neighbors, the Hellenes, and when the latter came into Greece, they called all tribes who could not account for their ancestors, Pelasgians. So far as we know, the Greeks were the first inhabitants of the land of Greece. Much light has been thrown, of late, on the so-called Heroic Age, by excavations, chiefly at Mycenae, Troy and cities on the island of Crete. These cities seem to have been the centers of an advanced civilization, and as Mycenae was the chief center the period has been given the name of the Mycenaean Age.

The period from about 1200 to 700 B. C. corresponds in the history of Greece to the Middle Ages in later European history, in that it lay between two periods of culture and prosperity. Events of this period are best explained on the basis of the so-called Dorian migration, although some historians treat the history of Greece without reference to any such migration. The Dorians themselves were conscious of being conquerors in the land in which they dwelt, and the fact that the great epic poems did not mention the Dorians shows that the authors of such poems must have known that the Dorians were newcomers. Legends represent the Dorians as coming from Epirus. They were, on entering the Peloponnesus, ruder and more warlike than the earlier inhabitants of the Peloponnesus, and their settlements in the most civilized parts of the ancient Mycenaean kingdom completely overthrew the earlier civilization. The Dorian dialect supplanted the native language, but the newcomers accepted largely the gods and the sanctuaries of their predecessors. This migration cannot have been later than 1000 B. C.

During the Mycenaean Age Greece had been largely affected by Oriental influences; during the Greek middle age, on the other hand, the land was left largely to itself. When the Dorians first settled down in the Peloponnesus, the largest and most important political division of the people was the tribe—the assembly of free-men for war. At the head was the tribal king, with elders. The State was not conceived of as existing for the protection of the individual, who was considered a nobody, except when he interfered with the tribe. Custom was the binding power, and there was no such thing as law. Gradually, after the settlements, the notion of private property appeared, and from this grew the beginnings of differences in rank. The men who had gained the largest tracts of land became more powerful and at length took titles.



In Sparta, however, old conditions survived longer than in any other place, and there was no aristocracy there. The development of the city-state was another important effect of the settlement. This organization spread over all Greece and came to be the determining factor in Greek history. In some cases the old tribal king became a local king, but his power was lessened as different officials were elected to assist him and as the council gradually assumed more of his functions.

During the Greek middle age the most important states were those on the coasts of Greece and Asia Minor and those on the islands between. In Asia Minor the leading city was Miletus, while in Greece proper the foremost cities were Euboea, Chalcis and Eretria. A distinct colonizing impulse appeared in Greece from the eighth to the sixth centuries B. C., and numerous trading stations were established, chief among which were Syracuse in Sicily, Tarentum in Italy, Coreyra in the Adriatic, Massilia (Marseilles) in Gaul, Cyrene in Africa and Byzantium on the Bosphorus.

Although during this period, as well as during later periods, the Greek communities were practically independent, there were unifying influences which the people were prompt to recognize as soon as any danger from without threatened them. Sparta, in the Peloponnese, was developing unity by her conquests, and the epic poetry which dealt with the former glory of Greece was a strong unifying force.

The third period of Greek history, from 700 to 500 B. C., may be known as the age of class struggles and adjustments. In the seventh and eighth centuries the Ionian cities took the lead in Greek civilization. They were the first to be strongly affected by commercial and colonizing activities, and they brought the Greeks of the mainland into closer relations with the Orient. During this period the chief bond of union between the Greek states was commerce, and not the idea of blood relationship, which had been strongest in the earlier period. Leagues based upon commercial interests were formed between states, and commercial quarrels were pursued regardless of blood ties. Meanwhile, the middle class came forward and demanded many privileges which had before belonged exclusively to the aristocracy. The individual, too, began to demand rights, and general dissatisfaction arose with the old laws. To satisfy new conditions in each district, lawgivers were appointed, who possessed the powers of dictators and were

empowered to draw up a code of laws. Among these lawgivers the most famous were Lycurgus of Sparta and Solon of Athens (See LYCURGUS; SOLON). The most important result of this new system of laws was that the people now knew what the laws were and could fix the responsibility for crime and injustice. Thus successful in their first opposition to the aristocracy, the people put forth a strenuous effort to overthrow completely the aristocratic government. Here and there men of genius or ability put themselves at the head of the revolutionary movements and gained unlimited power. These men were called tyrants, and they were practically kings, although in most cases they enjoyed larger power than the earlier kings had done.

In the fifth century B. C. a common danger drew the Greek states closer together than they had been before. The Ionian cities had been conquered in the sixth century by the king of Persia, and when in 500 B. C. some of the cities revolted against the Persians, the Athenians sent ships to assist them. The Athenians met with some successes, but were finally completely defeated by the Persians in a battle near Ephesus. Darius, the Persian king, was enraged by the share which the Athenians had taken in this revolt, and in 492 B. C. he dispatched Mardonius, his son-in-law, into Greece to punish the Athenians. A storm off Mount Athos destroyed a large part of the Persian fleet, and the army of Mardonius suffered so severely from the attacks of the Thracians in his march through the country that he retreated to Asia. Darius, however, was still unappeased, and two years later he sent another force into Greece, which was completely defeated by a band of Athenians and Plataeans on the Plain of Marathon. This defeat of the Persians had great moral significance. The expedition had been small because the Persians believed that Greece could be conquered without much difficulty, but the defeat of this small force by a small force of Greeks greatly lessened the fear which was felt of the Persians.

By her part in the defeat of Persia, Athens had risen to the acknowledged headship of Greece. Themistocles, foreseeing that the struggle was not over, persuaded the Athenians to enlarge their naval force, upon which he felt sure the chief dependence of the Greeks would of necessity be in a further struggle. In 480 B. C. Xerxes, the son of Darius, undertook to carry out the project in which his father had twice signally failed. With an army which is

said to have numbered over 2,000,000, he crossed the Hellespont and marched along the coast through Thrace and Macedonia toward Attica. Sparta and Athens summoned a congress of the Greek cities to meet at Corinth; but not all of the cities were represented, and of those which were, all did not enter into the alliance. Themistocles proposed a plan of campaign which was finally adopted. This was to avoid a battle on land, because the Persian army was so much larger than the Greek, but to attempt to force a naval battle as soon as possible, because it was felt that on the sea Greece was more nearly the equal of Persia.

A small force was sent to block the enemy's advance at the narrow pass of Thermopylae, which formed the only entrance into Greece. On the third day of the struggle at Thermopylae the Persians were led around over a pass to the rear of the small Spartan army, and the defenders of the pass were all put to death. The great naval battle at Salamis and the battle at Plataea, in both of which the Greeks were victorious, drove the Persians from Greek territory, and they never again attempted to enter it. The victory for the Greeks had been the result of the united action of the different states, the superiority of the Greek infantry, the inability of the Persians to use their cavalry in the mountainous country and the superior seamanship of the Greeks. These wars in their happy issue gave the Greeks half a century of peace and gave Athens and Sparta, the two great powers, leisure to develop their civilization practically unhindered (See ATHENS, subhead *History*; SPARTA, subhead *History*). It was during this period that Athens reached her greatest height and became the center of Grecian art and literature (See PERICLES; AESCHYLUS; SOPHOCLES; EURIPIDES; SOCRATES; HERODOTUS; THUCYDIDES; XENOPHON).

The first serious break in the peaceful and prosperous condition of Greece came with the Peloponnesian War, which began in 431 B. C. The rivalry between Athens and Sparta was not such as to render war inevitable, as Athens was the chief power on the sea and Sparta on the land. There was constant jealousy between the two, however, and an occasion for war was found in the relation of Athens to her allied states. Sparta's plan at the beginning of the hostilities was to ravage Attica and stir up the colonies of Athens to revolt, while that of Pericles was to occupy as far as possible the coast towns and the islands, to destroy the commerce

of the Peloponnesus and to risk no land battles. This plan worked well for Athens until a plague broke out in the city and carried off more than one-fourth of the population. Pericles was among the victims, and there was no one who could take his place. The disastrous expedition to Sicily in 415 B. C. (See ALCIBIADES; NICIAS) turned the tide against Athens, and although she held out for ten years longer she was compelled by the destruction of her fleet at Aegospotamos, in 405, to surrender in the next year to Sparta and to accept the most humiliating conditions of peace.

The Athenian leadership was thus brought to an end, and for thirty-five years following the Peloponnesian War Sparta was supreme in Greece. The smaller Greek states, which had hoped for independence as the outcome of the war, were disappointed in their expectations, as the Spartan period of rule was marked by the restoration of oppressive and tyrannical oligarchies upon the ruins of the democracy for which Athens had been fighting. At length, so unendurable did this tyranny of Sparta become, the other states rose against her, under the leadership of Thebes. With Pelopidas and Epaminondas to guide the movement, the revolt was speedily successful, and at the great Battle of Leuctra, in 371, the hitherto undefeated Spartan army was utterly overthrown (See THEBES; EPAMINONDAS; PELOPIDAS). The Theban supremacy, which lasted for less than ten years, again made democracy the dominant form of government in Greece. In 361 B. C. Athens and Sparta, the old-time rivals, combined against Thebes. At the Battle of Mantinea Epaminondas was killed, and with his death the Theban power ended.

The death of Epaminondas threw Greece into confusion. The entire history of the Greek states had consisted in a series of struggles against the idea of unity under one imperial power, and these very struggles for independence had so weakened the states that they fell an easy prey to the strong power which was rising in the north. This was the kingdom of Macedonia, under Philip. By means of skilful intrigue and almost unopposed conquest, Philip gained control of Olynthus, Thrace and Phocis. At Athens Demosthenes saw the peril, and in his famous *Philippics* he urged his countrymen to meet it. Thebes and Athens combined against Philip and met him at Chaeronea in Boeotia (338 B. C.), but were utterly defeated. A congress of the Greek states, held at Corinth, recognized Philip as their



leader and declared him commander in chief of the Greek forces. This conquest by Philip did not mean the complete subjugation of the Greeks; the Macedonians were a Hellenic people, and Philip himself recognized the superiority of Greek life and culture over Macedonian. Philip was succeeded by his son Alexander (See ALEXANDER THE GREAT), under whom Grecian influence was extended over a great part of Asia.

The history of Greece and Macedonia for nearly two centuries after Alexander is marked by continued internal dissension, by the invasion of the Gauls (279 B. C.), and by the increasing danger from the rising power of the West. Most of the states were grouped under two confederacies, the Achaean and the Aetolian leagues. A united Greece might have remained independent, but under the prevailing conditions her resistance to Rome was but feeble and ended with the capture and burning of Corinth in 146 B. C., after which Greece was made a province of Rome, under the name of Achaia.

For over half a century the country prospered, but a revolt during the Mithridatic War brought down upon Greece the vengeance of Rome. Athens was sacked by Sulla in 86 B. C. and Thebes was destroyed in the following year. During the period following the establishment of the Empire, Greece prospered under Roman rule. Her condition was most favorable during the reign of Augustus and later under Trajan and Hadrian. Athens retained her preëminence in art and letters, and many of the young men of Rome were sent to Athenian schools. Christianity made wonderful progress during this period and finally triumphed over the ancient paganism. In 330 Constantine moved the seat of the Roman Empire to Byzantium, afterward called Constantinople. After the division of the Roman Empire into the Eastern and Western empires, in 395, Greece was a part of the Byzantine Empire until the capture of Constantinople by the Turks in 1453. See BYZANTINE EMPIRE.

After the fall of Constantinople, Greece was speedily subdued and was incorporated in the Turkish Empire. Under their barbarous conquerors, the Greeks sank into a pitiable condition, but their devotion to their Church and the fact that the system of local self-government had been allowed to exist helped in preserving their nationality, in spite of the persecutions of the Turks. In 1821 the war for independence broke out under Alexander Ypsilanti. The Turks by wholesale massacres and executions tried to check the revolt, but the Greeks were deter-

mined, and in January, 1822, the national assembly convened at Epidaurus, adopted a provisional constitution and proclaimed Greece independent. The cruelty with which the Turks treated the Greek Christians and also those in Constantinople aroused the sympathies of civilized Europe. Many champions appeared, among them Lord Byron. The struggle was continued for nine years, and one of the most memorable events during that time was the exploit of Marco Bozzaris (See BOZZARIS, MARCO). The struggle was finally decided by the naval battle of Navarino, October, 1827, in which the Turkish-Egyptian fleet was annihilated by the combined fleets of England, France and Russia. Capo d'Istria, a Greek statesman in the service of Russia, was chosen president in 1828. In 1830 a congress of the great powers in London declared Greece an independent kingdom and forced Turkey to agree to that declaration.

Capo d'Istria became unpopular, from his attempts to rule as dictator, and in 1831 he was assassinated. Otto II, son of the king of Bavaria, was chosen king, and he took the power in 1832. A constitution had not been formally promised, but the Greeks expected one, and, while Otto's rule was not despotic, the fact that he did not proclaim a constitution made them fear future danger. In September, 1843, the army and the people surrounded the palace and demanded a constitution. The king yielded without violence, and the constitution went into effect in the following year, but Otto's unpopularity increased, and in 1862 he was deposed and compelled to leave the country. The national assembly elected Prince George of Denmark as king, the powers confirmed the election and King George took office in October, 1863. According to the agreement made by England, the Ionian Islands were annexed to Greece in the same year. George granted a liberal constitution, and Greece prospered under his firm rule. The Congress of Berlin in 1878 recommended the addition to Greece of southern Thessaly and Albania. Turkey refused, and war seemed imminent, but was averted by the cession to Greece of nearly all of Thessaly and part of Epirus.

In January, 1897, Greece attracted the attention of the civilized world by her championship of the cause of the Christians in Crete, who had revolted against Turkish rule and sought annexation to Greece. Greece attempted to annex the island, and the result was war between Greece

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and Turkey. The condition of Greece by no means warranted a war with Turkey, and from the first she was unsuccessful on every side. The Turks were threatening Central Greece in May, 1897, but Russia stepped in and demanded that operations cease. In December of that year a final treaty was signed, by which Greece promised to pay to Turkey an indemnity amounting to \$18,000,000, the payment to be guaranteed by the powers. In 1898 Turkey was compelled by the powers to withdraw from Crete, which was declared an independent state, with Prince George, son of the king of Greece, as governor. In 1912-13 Greece took part in the war of the Balkan allies against Turkey. As a result of that war Greece added considerably to its territory in the northeast, gaining a part of Macedonia, and the other allies also profited. Population in 1907, 2,631,952.

**Greek Church**, the church of the countries formerly comprised in the Greek, Eastern, or Byzantine, Empire, and of the countries converted to its teachings, as Russia. Its official name is "The Holy Orthodox Catholic and Apostolic Church," the word Orthodox being especially emphasized by its adherents. The so-called Greek Church is now divided into three distinct branches: 1, The Orthodox Church in the Turkish Empire, subject to the patriarch of Constantinople, who is under the protection of the sultan and has a certain official civil rank, but may be appointed and deposed at the will of the sultan. At Alexandria, Jerusalem and Antioch are subordinate patriarchates. 2, The Orthodox Church in Russia, under the Holy Synod of Saint Petersburg, and primarily under the czar, who is the recognized temporal head of the whole Greek Church. 3, The National Church of Greece, established under a Holy Synod since 1833. The so-called "United Greek Church," in Austria-Hungary, southern Italy, Poland and parts of Russia, conforms in some respects to the Greek rites, but acknowledges the supremacy of the Roman pontiff. The separation of the Greek and Roman churches is closely connected with the division of the Roman Empire into Eastern and Western. The rise of Constantinople and the growing jealousy and rivalry in Church and State made a continued condition of dependence impossible. The insertion in the Nicene Creed of *filioque* (and from the Son) by the Latin Church and the question of papal supremacy caused constant discord. In the latter part of the ninth century began the so-called Great Schism, but the final division did

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not formally take place until 1054. Besides doctrinal differences, the war of the Iconoclasts, or "image breakers," contributed not a little to the discord, the patriarchs frequently supporting those who sought to destroy the images of the Latin Church. The conduct of the Latin princes at Constantinople during the Crusades and the establishment of the Latin kingdom there completed the separation. Ineffectual attempts were made to secure the adherence of the Greek Church in the period of the Protestant Reformation, first by Melancthon, later by a formal Lutheran embassy. In the following century the patriarch Lucaris, who was in sympathy with the Calvinistic doctrines of the West, tried to carry his fellow churchmen with him, but failed. As recently as 1869 a correspondence was entered into by the archbishop of Canterbury relative to a union of the Anglican and the Greek churches. The difference between the Greek and Roman churches consists in the rejection, by the former, of the supremacy of the pope and the elimination of the word *filioque* from its creed. They admit the seven rites of the Roman Church, namely, baptism, confirmation, eucharist, penance, extreme unction, holy orders and matrimony, but with considerable variation in their observance. Baptism consists of a triple immersion, and confirmation follows it immediately, even in the case of infants, and may be given by priests, as well as bishops. In the eucharist, or Lord's Supper, the Greeks admit the real presence of Christ in the elements, and the adoration of the host. They use leavened bread and give communion in both kinds to adults and children alike. They recognize confession and priestly absolution. The same honor is paid to relics as in the Roman Church; pictures are adored, but no graven image, except the cross, is permitted. Fast periods and days are numerous. Pentecost, the day of Saint Peter and Saint Paul; six weeks before Christmas, and the usual Lenten fast are kept, also all Wednesdays and Fridays. They believe in the intercession of saints, and, especially, of the Virgin Mary. Instrumental music is forbidden in the service, and singing is allowed by male voices only. In public prayer—except at Pentecost—they stand, with the face toward the east. Their ceremonial is formal and splendid. The priests and deacons are usually required to marry before being ordained as clergymen. They are prohibited from marrying widows and may not themselves remarry. Bishops are forbidden marriage and hence are chosen from the monas-



tic orders. The monastic institution has always existed in the Greek Church; convents are numerous. The total membership of the Greek Church is estimated at 98,016,000, of whom about 90,000,000 are in the Russian Empire.

**Greek Fire**, an inflammable and destructive compound used in medieval warfare, especially by the Byzantine Greeks. It was poured from caldrons and ladles, vomited through long copper tubes or flung in pots, phials and barrels. The art of compounding it was concealed at Constantinople with the greatest care, but it appears that naphtha, sulphur and niter entered into its composition, which varied from time to time. The use of these combustibles was largely the cause of the superiority of the Greeks for centuries.

**Greek Language.** The Greek language is a member of the Aryan or Indo-European family, its various dialects constituting the Hellenic group. It was probably spoken at least 1500 years before our era by the Greeks in Europe and Asia Minor. The fact that Greece was the seat of classical learning, the source of philosophy and letters and, later, the center of Christian teaching, made Greek in the early centuries of our era a universal language among the cultured classes, just as Latin afterward became the medium of international communication. During the Dark Ages Greek was little known to Western Europe, although it remained the language of the Byzantine Empire. The emigration of the Greeks to Italy after the fall of Constantinople and during the century preceding, gave a new impetus to the study of the Greek language, and the revival of learning gave it the place it has ever since occupied (See RENAISSANCE).

Of Greek in its earliest common form no literary monument remains. The three dialects in which it appears are designated Doric, Aeolic and Ionic. Aeolic was spoken chiefly in Northern Greece; Doric in the Peloponnesus, in Crete and in the various colonies; Ionic was used in Attica and Asia Minor. Of the Doric, Pindar and Theocritus are the chief literary representatives. Ionic is commonly divided into three stages—the old Ionic, or epic, in which the poems of Homer and Hesiod were written; the new Ionic, the dialect of Herodotus, and the Attic, in which most of the masterpieces of Greek literature are written. The preëminence of Athens in the world of politics and of letters made its dialect the standard (See ATHENS, sub-head *History*). During the centuries following

the classical period, Greek underwent changes due to the usual internal modification and corruption and to contact with other languages. Modern Greek has, however, preserved the integrity of the written language to a remarkable degree, so that the student of classical Greek can read modern Greek with little difficulty. The spoken language varies considerably, at least from the commonly accepted standard of pronunciation of the ancient tongue. As compared with Latin, the legacy of Greek to our language has been small, less than one-ninth of the modern English vocabulary being of Greek origin, while nearly one-half may be traced back to sources originally Latin.

**Greek Literature.** See LITERATURE, sub-head *Greek Literature*.

**Greeley, HORACE** (1811–1872), an American journalist and politician, born in Amherst, N. H. He was employed first as a farm laborer, and then as a compositor, and in 1831 he went to New York, where, after an unsuccessful attempt to start the *Morning Post*, the first penny paper, he commenced in 1834 to issue the *Weekly New Yorker*, which ran for seven years. The *Log Cabin*, another weekly, established by him in 1840, reached a circulation of 80,000 and gave him a reputation which ensured the success of his *Daily Tribune*, founded in 1841 and edited by him till his death. In 1848 he was elected to Congress. In 1851 he visited Europe and was one of the jurors in the Great Exhibition. He was an earnest antislavery worker, though not an abolitionist, strictly speaking. When the South threatened to secede, he said that the people of any state had the right to withdraw, but he did not believe the votes for secession were fair expressions of the people's will and he therefore was a firm supporter of President Lincoln. At the close of the war, he advocated a general amnesty and universal suffrage, and he signed the bond of Jefferson Davis, securing his release. In 1872 he was nominated for the presidency by a party known as the Liberal Republicans and was supported by the Democrats, the Greenback party and many anti-administration Republicans, but was defeated by President Grant. The strain of electioneering and the death of his wife brought on an illness of which he died a few weeks later, before the count of the electoral vote. Chief among his literary works are his *Hints Toward Reforms*, *History of the Struggle for Slavery Extension*, *The American Conflict* and *Recollections of a Busy Life*. Consult Porter's *Life of Horace Greeley*.

## Greely

**Greely, ADOLPHUS WASHINGTON** (1844–), an American soldier and explorer, born at Newburyport, Mass. He was a volunteer in the Civil War and was made captain and brevet major of volunteers. In 1868 he was placed in the signal service, and between 1876 and 1879 he constructed 2000 miles of military telegraph in the West. In 1881 he conducted an expedition to the Arctic regions, reached 83° 24', the farthest point reached up to that time, and made many valuable geographical discoveries. Of twenty-five men, only Greely and six others survived until the summer of 1884, when they were rescued by a relief party under Capt. W. S. Schley. In 1886 he published *Three Years of Arctic Service*, and in 1887 he was made chief of the signal service, with rank of brigadier general. Thousands of miles of wire and wireless telegraph were built under his direction in China, Cuba, Porto Rico and the Philippines between 1898 and 1905. He was the author of *American Weather* and *American Explorers and Travelers*. See NORTH POLAR EXPLORATION.

**Green, ANNA KATHARINE.** See ROHLFS, ANNA KATHARINE GREEN.

**Green, JOHN RICHARD** (1837–1883), an English historian. For some time he wrote constantly for the *Saturday Review*, but it was not until the publication of his *Short History of the English People* that he secured fame. This work was subsequently expanded into the *History of the English People*, in four volumes, which was followed by *The Making of England*, a work for scholars. After his death, his wife, who had always aided him in his work, published his *Conquest of England*.

**Green'away, KATE** (1846–1901), a famous illustrator of children's books. She passed most of her life at Hampstead, London. By formal study and painstaking observation of children, she produced a style of representation which was charming for its simplicity. Her best-known works are *Kate Greenaway Little Folks' Painting Book*, *Mother Goose* and *Language of Flowers*.

**Green'back Party**, a political party organized for the purpose of increasing the amount of greenback currency, as a means of allaying the distress caused by the increase in the value of the precious metals. The movement began about 1868, when it was proposed to retire gradually all the greenbacks, but the party did not organize formally until November, 1874. Its first presidential candidate was Peter Cooper, in 1876, who received about 180,000 votes; chiefly in the West. The party was united with the labor organizations

## Greene

in the following year and was called the National, or Greenback-Labor, party. In 1878 it polled more than a million votes and elected fourteen congressmen. Its presidential candidate in 1880 was Weaver of Iowa, and in 1884, General Ben Butler, but its following constantly diminished, and it ceased to have important independent influence within a few years, being largely absorbed by the Populist party.

**Greenbacks**, the popular name given to the paper currency first issued by the United States government in 1862, during the Civil War. It is sometimes used also to include United States bank notes. See CURRENCY.

**Green Bay, Wis.**, the county-seat of Brown co., 113 mi. n. of Milwaukee, on Green Bay, at the mouth of the Fox River and on the Chicago, Milwaukee & Saint Paul, the Chicago & Northwestern, the Green Bay & Western and other railroads. The city's harbor admits the largest lake steamers, and there is an extensive trade in lumber, grain, fish and other articles. The manufactures include furniture, paper, cheese, beer and canned goods. An old indian village was established on the shore of the bay, and the early French explorers here met the indians for their trade in fur. The first settlement was made in 1745. About 1816 Fort Howard was built on the west side of Fox River, and a settlement grew up around it. Green Bay was chartered as a city in 1854, and in 1896 Fort Howard was united with it. Population in 1910, 25,236.

**Green Brier**, a popular name in the United States for several very common, thorny, climbing shrubs, with yellowish-green stems, thick leaves and small bunches of flowers. *Smilax* is the correct name.

**Green'bush, N. Y.** See RENSSELAER, N. Y.

**Greene, NATHANAEL** (1742–1786), a general of the American Revolutionary army, born at Patowomut, R. I. In 1770 he was elected to represent Coventry in the general assembly of Rhode Island, in 1774 he joined the Kentish Guards as a private and in May, 1775, he was appointed brigadier general and commander of the Rhode Island contingent in the army before Boston. He gained at once the confidence of Washington, was made major general and was appointed to the command of the troops in Long Island. In the early movements there he showed great skill, but his failure to withdraw his forces from Fort Washington resulted in a defeat (November, 1776). At Trenton, Princeton, Brandywine and Germantown he led a division, and in the subsequent fighting he held



## Greenfield

important commands and repeatedly distinguished himself. In 1778 he was quartermaster general, and in 1780 he presided at the trial of Major André. In the same year he was appointed to the command of the southern army and succeeded, by turning repeated defeats to his ultimate advantage, in wresting Georgia and the Carolinas from the British. After the conclusion of peace Greene lived in Rhode Island until 1785, when he removed to Georgia. Among the American generals of the Revolutionary War, Greene ranks next to Washington as a tactician and field commander.

**Greenfield**, MASS., the county-seat of Franklin co., 34 mi. n. of Springfield, on the Connecticut River and on two lines of the Boston & Maine railroad. The town contains manufactories of cutlery, shoes, machinists' tools, wooden ware, bricks, toys, baby carriages and other articles. There are two public libraries, a county hospital and a soldiers' monument. It was settled in 1686, but remained a part of Deerfield until 1753. Population in 1910, 10,427.

**Greengage**, a large and finely flavored variety of the plum, well known in the United States. It is of a green or yellowish color and has a juicy, greenish pulp. See PLUM.

**Greenheart**, a tree, native of Guiana, called also the *bebeeru*. Its wood is hard and durable and is used in shipbuilding, not being liable to attacks from the teredo.

**Greenhouse**, a building for the protection and growth of delicate plants. It includes a forcing house, a hot house, a conservatory, an orchard house and other buildings and rooms for special purposes. A greenhouse in which a temperature higher than is necessary for the life of plants is maintained is called a *forcing house*, or *hot house*, and one which is used for the display of flowers, rather than for the growth of flowers, is a *conservatory*. Greenhouses are generally made of glass, an expedient which prevents the escape of much of the heat derived from the sun. When this heat is not sufficient, artificial heat is supplied. The smaller structures are heated with stoves; the largest and best constructed are heated by steam or hot water, carried in coils of pipe.

**Greenland**, an extensive island, belonging to Denmark, situated n. e. of the continent of North America, from which it is separated by Davis Strait, Baffin Bay and Smith Sound. The most northerly point does not extend farther than about latitude 83°. The surface

## Green Mountains

of Greenland is mountainous throughout, having elevations from 2000 to 6000 feet above the sea, and is similar, in general appearance, to parts of Norway and Sweden. There are many deep fiords and thousands of glaciers, some of which are the largest in the world. Among these are the Humboldt, regarded as the largest of all known glaciers, having ice fronts of 45 to 60 miles; the Petowik, the Great Kariak and the Jakobshaven. The highest summit is Petermann Peak, which is 9000 feet above sea level. Though most of Greenland is covered with snow, during summer months the soil produces rich vegetation, consisting of shrubs, herbs, mosses, saxifrage, poppies and other Arctic plants. Among the animals living in the island are the polar bear, the lemming, the hare, the reindeer, the fox and the musk ox. The principal exports are whale and seal oil, seal-skin and eiderdown, and the trade is carried on by the Royal Danish Greenland Company. The best-known settlements are Upernivik (the most northern civilized settlement on the globe), Godhavn, Egedesminde and Ivigtut. The Norwegians were the first ones to set foot in Greenland and made settlements there in 983. In 1585 Davis rediscovered the island. In 1721 the Danes secured a hold on the west coast and established a number of mission stations, which prospered. The best-known explorations in Greenland have been those of Nordenskjöld, Greely, Nansen and Peary. The population of Greenland is estimated at about 12,000, most of whom are civilized Eskimos.

**Green Mountain Boys**, the name assumed by a body of soldiers from Vermont during the Revolutionary War. They were originally organized by Ethan Allen to oppose the claims of New York to the territory of Vermont, but they continued their organization throughout the Revolution, being responsible for some notable victories, including the capture of Ticonderoga and Crown Point and the Battle of Bennington.

**Green Mountains**, a mountain range of the Appalachian system, commencing near New Haven, Conn., and extending north through Massachusetts and Vermont, between Lake Champlain and the Connecticut River. The highest summits are Mansfield Mountain, 4364 feet; Killington Peak, 4241 feet, and Camel's Hump, 4088 feet. On the mountains grow forests of fir, pine, hemlock, birch and oak. They also contain valuable deposits of iron, slate, marble and copper.

## Greenough

**Greenough**, *green'ō*, HORATIO (1805-1852), an American sculptor, born in Boston, Mass. He graduated from Harvard in 1825 and while at college made a thorough study of anatomy. In his early period he made the design from which Bunker Hill monument was constructed. He studied in Rome and later had his studio in Florence. His works were mostly produced in Italy and are highly prized. His colossal statue of Washington is among the most important of them, and others are *Ariel*, *Chanting Cherubs* and *Wisdom*.

**Green River**, a river of Kentucky, which rises near the center of the state, flows generally westward and northwestward and enters the Ohio River 200 miles below Louisville. It is about 300 miles long and is navigable for boats for about 200 miles.

**Greensboro**, *greenz'bur o*, N. C., the county-seat of Guilford co., 81 mi. n. w. of Raleigh, on the Southern railroad. This city is in a fruit, grain and tobacco-growing region and is near great copper and iron mines. The industries also include blast furnaces, cotton mills and the manufacture of milling supplies, machinery, flour, brick and other articles. The place was settled in 1808 and was first chartered in 1870. Population in 1910, 15,895.

**Greensburg**, IND., the county-seat of Decatur co., 47 mi. s. e. of Indianapolis, on the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. The city is in a fertile agricultural region, has a beautiful park and is the seat of the Indiana Odd Fellows' Home. It is supplied with natural gas and has flour mills, carriage and furniture factories and large stone quarries. Population in 1910, 5420.

**Greensburg**, PA., the county-seat of Westmoreland co., 31 mi. s. e. of Pittsburg, on the Pennsylvania railroad. The borough is in a coal mining region, has natural gas and contains coke ovens, iron, glass and steel works and other factories. Several private institutions for secondary education are located here. Population in 1910, 13,012.

**Greenville**, Miss., the county-seat of Washington co., 140 mi. s. of Memphis, on the Mississippi River and on the Yazoo & Mississippi Valley and the Southern railroads. The city is in a productive cotton region, has cotton-seed oil and lumber mills and a large river trade. Population in 1910, 9610.

**Greenville**, OHIO, the county-seat of Darke co., on Greenville Creek, 35 mi. n. w. of Dayton and on the Cincinnati Northern, the Cleveland,

## Greenwich

Cincinnati, Chicago & Saint Louis and other railroads. It is in an agricultural region, has considerable local trade and contains foundries, lumber mills, machine shops and other factories. Greenville is built on the site of an indian village, which was for a time the home of Tecumseh and his brother, The Prophet. General Wayne concluded his treaty with the indians here in August, 1795. The settlement was first incorporated in 1832. Population in 1910, 6237.

**Greenville**, S. C., the county-seat of Greenville co., 153 mi. n. w. of Columbia, on the Southern and other railroads. The city is an educational center and is the seat of Furman College, Greenville Female College, Greenville College for Women, Chicora Female College, a military institute and a business college. The industries include flour and cotton mills, carriage works and other factories. The place was settled in 1784 and was incorporated in 1831. Population in 1910, 15,741.

**Greenville**, TEX., the county-seat of Hunt co., 56 mi. n. e. of Dallas, on the Missouri, Kansas & Texas and other railroads. The city is in an agricultural and stock-raising region and has an extensive cotton trade and large manufactories of cotton products, also stockyards, flour mills, machine shops and brickyards. It is the seat of Burleson and Holiness colleges. Greenville was settled in 1844 and was incorporated in 1875. Population in 1910, 8850.

**Greenwich**, *grin'ij* or *green'ij*, a parliamentary borough of England, in the County of Kent, on the right bank of the Thames, about 5 mi. s. e. of London Bridge. There are extensive iron foundries and engineering works, boat-building yards, boiler works, mast, block and sail works, telegraph cable works, roperies and chemical factories. An object of great interest is the magnificent hospital, the oldest portion of which was originally a palace of Charles II. As a hospital for aged and disabled seamen of the navy, it was opened in 1705, and it subsequently accommodated about 3000. In 1865, however, it ceased to be an asylum for seamen, and it is now the seat of the Royal Naval College for the education of naval officers. The celebrated observatory of Greenwich, erected by Charles II in 1675, stands upon an eminence in the park. The longitude of all British maps and charts and of those issued by many other nations is computed from this observatory. Population, in 1911, 96,000.



## Grégoire

**Grégoire**, *gra gwahr'*, HENRI, Count (1750–1831), bishop of Blois, a churchman and statesman of the French Revolution. He was instrumental in having slavery abolished in all the French possessions and worked for giving to the Jews in France full civil rights. He was a member of the Council of Five Hundred and of the Senate (1801). On the conclusion of the concordat he resigned his bishopric. He voted against the establishment of the Empire and was the only one in the Senate who resisted the restoration of titles of nobility. He himself afterward accepted the title of count, but in the Senate he was always one of the small body who opposed Napoleon, and in 1814 he was one of the first to vote for his deposition. He passed the latter part of his life in retirement, and at his death the Church refused him the last offices of religion. He left numerous works, among them *The Ruins of Port Royal*, *Historical Essay upon the Immunities of the Gallican Church*, *History of Religious Sects since the Beginning of the Century* and *The Annals of Religion*.

**Grego'rian Calendar**, the calendar as reformed by Pope Gregory XIII, in 1582. The *Gregorian year* is the ordinary year, as reckoned according to the Gregorian calendar. See CALENDAR.

**Greg'ory**, the name of sixteen popes and two antipopes. GREGORY I (540–604) (called also *the Great*), was born at Rome, of noble and wealthy family. He became a member of the Senate, and was made prefect of Rome in 573. He expended his inheritance in the foundation of monasteries and charitable institutions, and he then took monastic vows himself. During this time he saw the beautiful Anglo-Saxon youths in the market-place and resolved to go to England himself and work for the conversion of their people. Pope Benedict I would not allow him to go. Pope Pelagius II sent him on an embassy to Constantinople and afterward made him papal secretary. On the death of Pelagius, in 590, Gregory was chosen his successor. He displayed great zeal for the conversion of heretics, sending missionaries to Sicily, Sardinia, Lombardy and England, as well as for the advancement of monachism and the enforcement of clerical celibacy. The works ascribed to him are very numerous; his genuine writings consist of a treatise on the *Pastoral Duty*, *Letters* and *Scripture Commentaries*. GREGORY VII (Hildebrand), pope from 1073 to 1085. His chief aim was to found a theocracy, in which the

## Gregory

pope should be the sovereign ruler in political, as well as ecclesiastical, matters. He therefore prohibited simony and the marriage of priests (1074) and abolished lay investiture (1075), the only remaining source of the authority of princes over the clergy of their dominions. The emperor Henry IV refused to obey this decree, and Gregory, after deposing several German bishops who had bought their offices of the emperor, and excommunicating five imperial councilors concerned in this transaction, summoned the emperor before a council at Rome to defend himself against the charges brought against him. Henry then caused a sentence of deposition to be passed against the pope by a council assembled at Worms. The pope, in return, excommunicated the emperor, and Henry, finding himself in difficulties, went to Italy, submitted at Canossa (1077) to a humiliating penance and received absolution. Gregory says that the emperor, "having laid aside all belongings of royalty, wretchedly, with bare feet and clad in wool, continued for three days to stand before the gates of the castle" before the pope would admit Henry to his presence. After defeating Rudolph of Suabia, however, Henry caused the pope to be deposed by the Council of Brixen and caused an antipope, Clement III, to be elected in 1080, after which he hastened to Rome and placed the new pope on the throne. Gregory passed three years as a prisoner in the castle of Saint Angelo, but was finally liberated and died in retirement at Salerno. His dying words were, "I have loved justice and hated iniquity; therefore I die in exile." GREGORY XIII (1502–1585), Ugo Buoncompagno, born and educated at Bologna. He settled in Rome in 1539 and was one of the theologians of the Council of Trent. On his return to Rome he was made cardinal and in 1572, on the death of Pius V, was elected pope. He was a patron of education, and a large portion of the colleges in Rome were wholly or in part endowed by him. A notable event of his pontificate was the correction of the calendar. He did much to strengthen the Jesuit order. GREGORY XV (1554–1623), born at Bologna. During his pontificate the Congregation for the Propagation of the Faith was established, and the present method of conducting the Papal Conclave was instituted. GREGORY XVI (1765–1846), a Venetian Oriental scholar and teacher of theology. In 1826 he was made cardinal prefect of the Propaganda and in this capacity made an agreement with the Netherlands regarding

## Gregory

**Roman Catholic** citizens, regulated Church matters in the United States and secured for the Catholics in Armenia emancipation from the sultan. In 1831 he was made pope, and during his pontificate he continued to extend the power and influence of the Church. He was a liberal patron of the arts and sciences. His most famous work was *The Triumphs of Papacy*.

**Gregory, LADY AUGUSTA PERSSE**, a British author, born at Roxborough, County Galway, Ireland. She was married in 1881 to Sir William Gregory, who died in 1892. Lady Gregory was from the first much interested in the movement for preserving the lore and the vernacular of Ireland, and published several books of legends told in the popular language. She produced, also, a number of plays which are faithful pictures, in their mingled humor and pathos, of the life of the Irish peasantry. These plays were produced by the Irish Players, and aroused much favorable comment. Her books include *Poets and Dreamers*, *Cuchulain of Muirthemne*, *Gods and Fighting Men* and *The Kiltartan Wonder Book*, and her plays *Spreading the News*, *The Canavans*, *The Rising of the Moon* and *The Workhouse Ward*.

**Grena'da**, one of the British West India islands, about 85 mi. n. w. of Trinidad. It is oblong in form,  $24\frac{1}{2}$  mi. long and 10 mi. broad, with an area of 133 sq. mi. The island is traversed north to south by an irregular mass of volcanic mountains, attaining elevations of 3000 and 3200 feet above sea level and having lateral branches of lower hills. The valleys between these contain alluvial tracts of great fertility, and rivers and rivulets are numerous. Cocoa, sugar, rum and spices stand first in the exports. The island has a lieutenant governor and a local legislature consisting of a council and a house of assembly of seventeen elected members. The capital is Saint George. Grenada was discovered by Columbus in his third voyage in 1498 and was colonized about the middle of the seventeenth century by the French. In 1762 it was taken by the British, and though recaptured by the French in 1779 it was restored to Great Britain in 1783. Population in 1911, 66,750.

**Grenade**, *gre nade'*, a small hollow bullet, or ball, of iron or other metal or of annealed glass, about  $2\frac{1}{2}$  inches in diameter, filled with gunpowder and fired by a fuse, so as to cause it to burst when thrown among the enemy. The term was first used by Du Billey, in reference to the siege of Arles (1536). Until about the

## Gresham

end of the seventeenth century, when musketry became common, soldiers of the line were trained to throw grenades by hand; hence the name *grenadier*.

**Grenadier**, *gren a deer'*, originally a soldier assigned to throwing the hand grenades. Companies of grenadiers were formed in France in 1670, and in England a few years later. With the development of the musket, the name soon became only a *souvenir* of the ancient practice; the troops so called generally formed one battalion of a regiment, distinguished by the height of the men and a particular dress, as, for instance, the high bear-skin cap. With the British and French the grenadier company was the first of each battalion.

**Grenfell, WILFRED THOMASEN** (1865— ), a medical missionary, noted for his work among the fishermen of Labrador. He was born near Chester, England, and educated at Oxford and at London Hospital. In 1889, under the auspices of the Royal National Mission to Deep Sea Fishermen, he fitted out a hospital ship and accompanied the fishermen of the North Sea on their cruises from the Bay of Biscay to Iceland. After three years in the work there he went to Labrador, where he established four hospitals, an orphanage, and various other institutions which he felt would be of help to the fisherfolk of that region. His little hospital ship makes voyages up and down the coast and he goes ashore at the scattered villages. His publications include *Adrift on a Pack of Ice*, *Off the Rocks, Labrador* and *Down to the Sea*.

**Grenoble**, *gre no'bl'*, a fortified town of France, capital of the Department of Isère, on the Isère River, 60 mi. s. e. of Lyons. It has a public library of 170,000 volumes and 7500 manuscripts, a college, a museum, a bishop's palace, a courthouse, an arsenal and extensive public gardens. The manufactures consist of gloves, linen and hemp goods, liquors and leather. Grenoble existed in the time of Caesar, and Gratian, who had improved it, changed its name from Cularo to Gratianopolis. Population in 1911, 77,438.

**Gresh'am, WALTER QUINTON** (1832-1895), an American jurist and politician, born in Indiana. He was educated at Indiana State University and was admitted to the bar in 1853, being elected to the state legislature in 1860 as a Republican. At the outbreak of the war he joined the Union forces and was made colonel of an Indiana regiment. Later he was brevetted brigadier general and then major general of volunteers. He was



appointed United States judge for Indiana in 1869 and was made postmaster-general under President Arthur in 1882. In 1884 he again became Federal judge. In 1893 he endorsed the Democratic platform, and he became secretary of state under President Cleveland in that year.

**Gresham's Law**, an economic principle, first announced by Sir Thomas Gresham, to the effect that when two different forms of money are in use, the one of lesser intrinsic, or bullion, value will always drive the one of greater value from use. This is due to the fact that coins of greater value will be reserved for foreign trade, since in those transactions the bullion value only is considered. The law has been applied in recent discussion to the question of bimetallism, the claim being made that the coin of lower value will drive the greater from use. This would be possible only provided that the demand for money did not equal the supply. See MONEY.

**Gret'na Green**, a village of Scotland, in Dumfriesshire, on the Solway Firth, 8 mi. n. of Carlisle, for nearly a century notorious for the celebration of the marriages of fugitive lovers from England. To conclude a lawful marriage in Scotland, it was only necessary for an unmarried couple to go and declare themselves man and wife before witnesses; but such marriages were ended in 1856, by an act declaring that no irregular marriage in Scotland shall be valid, unless one of the parties has resided in Scotland for twenty-one days next preceding such marriage.

**Gretry**, *gra tre'*, ANDRÉ ERNEST MODESTE (1741-1813), a famous French composer, born at Liege. He received his instruction under private tutors. The composition of a mass secured for him a course of study in Rome under the auspices of a high Church officer. His eagerness and impatience under the restraints of diligent study prevented his making as great progress as his natural talent would have made possible for him. He left Rome and after considerable hardship secured the coöperation of influential persons and wrote the music for Marmonter's *Le Huron*, which was his principal work and the one upon which his fame rests. Most of his work is now neglected, though much of it contains pleasing melody and dramatic fervor.

**Grévy**, *gra ve'*, JULES (1807-1891), a French statesman, a president of the French Republic. He held several public offices during his early life, and in 1848 he was made a member of the

National Assembly. After the proclamation of the Second Empire, he retired from political life and won a high reputation at the bar. When the Republic was declared, he was again returned to the National Assembly and became in 1871 its president. On the resignation of President McMahon in 1879, Grévy was chosen president of the Republic for seven years, and in 1886 he was reelected. He resigned in December, 1887.

**Grey**, *gray*, ALBERT HENRY (1851—), fourth earl of Northumberland, an English statesman. He was educated at Harrow and at Trinity College, Cambridge, where he graduated with honors. He was a Liberal member of Parliament for six years, and in 1896 succeeded Cecil Rhodes as representative of the British South Africa Company, of which he was a director. Three years later he became lord lieutenant of Northumberland, and in 1905 he became governor-general of Canada, succeeding Lord Minto. He resigned his office in Canada in 1911, and returned to England.

**Grey**, CHARLES, EARL (1764-1845), an English statesman, educated at Eton and at Cambridge. In 1786 he was returned to Parliament as member for Northumberland, and he soon became prominent in all important discussions. From the first he was deeply interested in the question of Parliamentary reform, and several times he presented petitions for reform. On the accession of the Grenville ministry in 1806, Grey was made lord of the admiralty, and on the death of Fox he succeeded to the office of secretary of foreign affairs and to the leadership of the House of Commons. The death of his father in 1807 raised him to the House of Lords, and from this time to 1830 he headed the Whig opposition in the House of Lords and especially opposed the proceedings against Queen Caroline. On the accession of William IV in 1830 and the retirement of the Wellington ministry, Grey was made prime minister and immediately took up the old question of Parliamentary reform. In 1832, after meeting with opposition which seemed insurmountable, he managed to pass his reform bill by inducing William IV to promise to create enough new peers to pass the bill. The threat of such a measure was enough to secure the carrying of the bill in the House of Lords. This bill, as put through by Grey, provided for the reform of the "rotten borough" abuses and increased representation for the northern cities and boroughs.

**Grey**, EDWARD, SIR (1862—), an English statesman, since 1905 probably the foremost

## Grey

figure in European diplomacy. As secretary of state for foreign affairs in the cabinets of Campbell-Bannerman and Asquith, he conducted the many delicate diplomatic negotiations in the decade preceding the outbreak of the War of the Nations. He was a conspicuous advocate of closer relations with foreign countries, and was instrumental in forming the alliance between Great Britain, France and Russia (see **TRIPLE ENTENTE**). With Germany he was less successful, notably in 1908, when he failed to prevent the annexation of Bosnia and Herzegovina by Austria, Germany's ally. In 1911, when Germany and France were quarreling over their interests in Morocco, he took a firm stand against German expansion in northern Africa. A year later he took the lead in attempting to end the Balkan War by a conference of delegates at London. During the summer of 1914 he conducted the negotiations between Great Britain and the other European powers, which finally led to the War of the Nations. Grey was first elected to Parliament in 1885, and has served since without interruption. Though at one time more distinguished as a tennis player than as a statesman, he gradually made his mark in politics, and even before his appointment to the foreign office in 1905 he was recognized as one of the ablest of the Liberals.

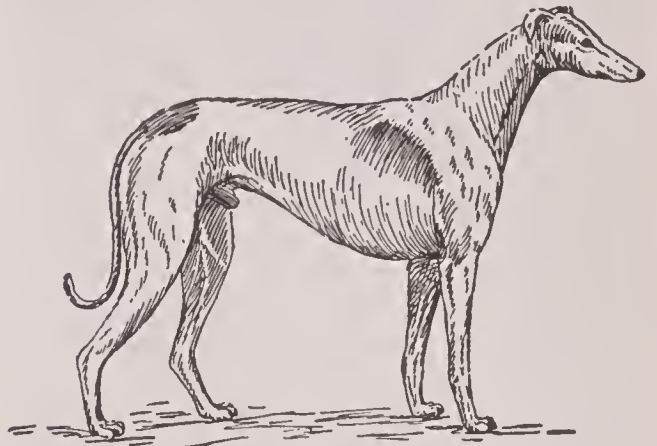
**Grey, LADY JANE** (1537-1554), the daughter of Henry Grey, afterward duke of Suffolk, and Frances Brandon, the daughter of Mary, sister of Henry VIII. She was married to Lord Guildford Dudley, the son of the duke of Northumberland, in 1553. Edward VI, who died in 1553, was induced on his deathbed to settle on her the succession to the crown, and the council tried to keep his death a secret that Mary and Elizabeth might be secured before the proclamation of Lady Jane as queen. Within ten days after the proclamation, however, Mary's claims had been recognized, and Lady Jane was confined to the Tower. She and her husband were beheaded on Tower Hill in February, 1554.

**Greyhound**, a variety of dog, distinguished by the long muzzle, very low forehead, short lips, thin and long legs, small muscles and contracted belly. There are several varieties, as the Irish, the Scottish, the Russian, the Italian and the Turkish. The common greyhound is of a slender build and is universally known as the fleetest of dogs. The name appears to have no reference to the color, but is derived from the Icelandic *grey*, a dog. The chief breeds are the Newmarket, the Lancashire and the Scotch.

## Griffis

**Grieg, greeg**, EDVARD HAGERUP (1843-1907), one of the most famous of Norwegian musicians, born at Bergen, Norway. He studied at Leipzig, later at Copenhagen and made several trips through Italy, Germany and England, earning everywhere well-merited praise for his playing of the piano. But he early began to devote himself almost entirely to composition. Grieg's music is filled with the enthusiasm and vigor of Scandinavian life, and many of his themes are drawn from Norwegian folk stories and national airs. Probably his most famous composition is the *Peer Gynt Suite*.

**Grif'fin** or **Gryphon**, a fabulous monster of antiquity, commonly represented with the body, feet and claws of a lion and the head and wings of an eagle. India or Scythia was anciently assigned as the native country of the griffins,



GREYHOUND

and it was alleged that they guarded the gold in the mountains. The figure of the griffin was common in heraldry.

**Griffin, GA.**, the county-seat of Spalding co., 43 mi. s. of Atlanta, on the Southern and the Central of Georgia railroads. The city is in a cotton and fruit-growing region and has some reputation as a resort. Wine is manufactured, grapes and peaches are largely exported and the town has large cotton mills. The state experiment farm is near the city. Population in 1910, 7478.

**Griffis, WILLIAM ELIOT** (1843- ), an American educator, author and clergyman, born in Philadelphia. He served in the civil War and later graduated from Rutgers College. Soon afterwards he went to Japan, where he organized schools on the American model, and later was appointed professor of physical science in the Imperial University of Tokyo. During his service there he wrote for the Japanese and English press. In 1874 he returned to New



York, where he finished his theological course and became pastor of a Reformed church in Schenectady, N. Y. Later he had charge of Congregational churches in Boston, Mass., and Ithaca, N. Y. Among his works published in book form are *The Mikado's Empire*; *Korea, the Hermit Nation*; *Matthew Calbraith Perry*; *Japan in History, Folklore and Art*; *Brave Little Holland and What She Taught Us*; *The Pilgrims and Their Three Homes, England, Holland and America*, and *America in the East*.

**Grimm**, JACOB LUDWIG (1785–1863) and WILHELM KARL (1786–1859), two brothers, German philologists and students of folklore. Jacob was professor and Wilhelm librarian at the University of Göttingen, but they were both expelled for political reasons, and later received positions in the University of Berlin. Their philological studies were extremely important, especially those of Jacob, whose *German Grammar* and *History of the German Language* became deservedly famous. The Brothers Grimm are most widely known, however, for the folk tales known in English as *Grimm's Fairy Tales*. They visited the old country folk, taking down from their lips the tales which had never been reduced to writing. *Grimm's Fairy Tales* have not the delicacy which distinguishes Andersen's but many of them are extremely popular.

**Grindstone**, a circular stone used for sharpening edged tools and smoothing surfaces. Grindstones are made from blocks of sandstone, which are fashioned into the desired shape and size. The stone is mounted on an axis, which passes through the center and is supported at each end on a frame. Small grindstones are frequently turned by hand or foot, but larger ones are operated by machinery. Those used in factories often weigh several tons. In grinding, the stone should revolve away from the one holding the tool. Great speed should be avoided with large stones, since the strain upon the stone when revolving at a high rate of speed sometimes causes it to break, hurling pieces with great force for long distances.

**Grippe**, *grip*, (French *La Grippe*), an infectious disease that frequently appears in epidemics during cold, damp seasons. See INFLUENZA.

**Griqualand**, *gre'kwah land*, **West**, a district of South Africa, n. of the Orange River and w. of the Orange Free State, with an area of about 15,190 sq. mi. The surface consists of undulating, grassy plains, suitable for grazing. Previous to the discovery of the diamond fields in the basin of the Vaal River, Griqualand was little

known. In 1870 the discovery of diamonds in that district began to attract wide notice, and in 1871 Waterboer, the Griqua chief, ceded all his rights to the British government and the territory was incorporated with Cape Colony. The diamond mines here are the most productive in the world. The chief center of this industry, as well as the seat of government, is Kimberley (See DIAMOND; KIMBERLEY). Population, 120,000.

**Gris-nez**, *gre na'*, CAPE, a headland of France, the nearest point of the French shore to that of Britain, the distance being barely 21 miles. It has a revolving light, 195 feet high.

**Gristle**, *gris'l*. See CARTILAGE.

**Grizzly Bear**. See BEAR.

**Grod'no**, a town of Russian Poland, capital of the government of the same name, on the Niemen, 160 mi. n. e. of Warsaw. The principal edifice is a palace erected by Augustus II; the oldest building is the Bernardine monastery, built in 1494. The manufactures consist of woolen, linen and silk goods, firearms and machinery. Grodno came under Russian control in 1795. Population in 1910, 54,900.

**Grom'well**, a name given to a genus of plants of the borage family. There are about forty species, of which eight or ten are found in the United States. The *field gromwell*, common along roadsides, grows to a height of one foot or more. It has broad leaves, downy beneath, and white flowers with small scales. A larger species is also found in similar locations. Other names by which they are known are *wheat thief*, *red root* and *stoneseed*. The plants bloom in the summer, and their seeds are often mingled with the seed of grains. Some yield a dye which is similar to the alkanet.

**Gro'ningen**, a town of the Netherlands, capital of a province of the same name, situated on the river Hunse, here converted into a canal, 92 mi. n. e. of Amsterdam. The principal edifices are the cathedral, a fine exchange, the government buildings and the university. It has manufactures of sugar, textiles, furniture, gold and silver ware, white lead and soap. There are oil, fulling and saw mills; an excellent harbor provides facilities for shipping. The town became a member of the Hanseatic League about 1282, and was annexed to the Netherlands in 1594. Population in 1910, 75,341.

**Gros**, *gro*, ANTOINE-JEAN, Baron (1771–1835), a French historical painter, born at Paris. At an early age he began studying with David and became one of his greatest pupils. Gros was the first one to depart from the classic art of

## Grosbeak

David and to use historical subjects in preference to classic. He was early associated with Napoleon and was thus given an opportunity to acquire material for the battle scenes which he produced. There is excellent coloring and depth of feeling in his paintings. In 1804 he produced his *Plague at Jaffa*, representing Napoleon ministering to the sick, a work which made him famous. His chief work is probably the *Cupola of Saint Genevieve* at Paris, exhibiting the saint protecting the throne of France, represented by Clovis, Charlemagne, Saint Louis and Louis XVIII. The artist received for it \$20,000 and the title of baron.

**Grosbeak**, *grose'beek*, a general name for a number of different birds whose beaks are large in proportion to the size of their bodies. In the United States the name is applied to a group of handsome finches that have strong, thick bills, which enable them to crack open even the stones of cherries. The *rose-breasted grosbeak*, which is one of the prettiest, has a sweet, simple little song. The male is largely black, with white lower parts and a beautiful rose-red breast. In the Southern states is found the *blue grosbeak*; to the north and west the *evening grosbeak*, and along the Atlantic coast and toward the interior, the *pine grosbeak*. In England the common species is often called the *hawfinch*.

**Grosswardein**, *grose'vahr dine*, or **Nagyvarad**, *nod'yvah'rod*, a royal free city of Hungary, capital of County Bihar, in a beautiful plain, on the Körös, 38 mi. s. s. e. of Debreczin. It consists of the town proper, surrounded by walls and otherwise fortified, and extensive suburbs. It is tolerably well built and is a railway center. The staple manufacture is earthenware. Population in 1910, 64,169.

**Grosvenor**, *gro've nur*, CHARLES HENRY (1833- ), an American lawyer and politician, born at Pomfret, Conn. He moved to Ohio in 1838, taught school for a time, studied law and was admitted to the bar in 1857. He served in the Union army from July, 1861, to November, 1865, being promoted from major to brigadier general. In 1874 he was elected to the state legislature and in 1885 to Congress as a Republican; he served until 1891 and again from 1893 to 1907. In Congress he became prominent as a leader of the conservative faction of the Republican party and was a member of many important committees.

**Grote**, GEORGE (1794-1871), an English historian and politician. As early as 1822 he began to collect materials for his *History of Greece*,

## Ground Squirrel

which appeared in twelve volumes between 1845 and 1856. This work, which terminates with the death of Alexander, was one which Grote was especially fitted to write, owing to his devotion to democratic ideas.

**Grotius**, *gro'she us*, or **De Groot**, HUGO (1583-1645), a Dutch scholar, born at Delft and educated at the University of Leyden. His work, *De Jure Belli et Pacis* (On the Law of War and Peace), on the fundamental principles of international law, is considered a standard authority and the foundation of modern knowledge of the subject.

**Grouchy**, *groo she'*, EMMANUEL, Marquis de (1766-1847), a noted French marshal. He entered the Royal Life Guards at the age of fourteen, saw much service and highly distinguished himself. In the war with Prussia (1806) and Russia (1807) and at Wagram, he acquired increased renown. After Blücher's defeat at Ligny in 1815, Grouchy was ordered to follow the Prussian retreat, and his strict and unreasoning obedience to this order was the cause of his absence from Waterloo and of Napoleon's defeat. He was banished under the second Restoration and lived a few years at Philadelphia. He returned to France in 1821, and under Louis Philippe he was restored to his former rank of marshal.

**Ground**, in painting, the first layer of color, which serves as a basis for the picture. The Italian school preceding and during the time of Raphael employed white grounds, but afterward, with the increased use of canvas, they adopted an oil ground of a dull red color. The Dutch and Flemish masters used light grounds, varying from white to gray; their example has been followed by painters of the modern European schools.

**Ground Hog**. See WOODCHUCK.

**Ground Ivy**, a common wayside plant of the mint family, with a creeping stem and purple flowers. It grows abundantly in Great Britain and is naturalized in the United States. In the spring it bears a large number of purple flowers. It was formerly used in flavoring ale.

**Ground'nut**, a name for the common peanut or for the tubers of certain other plants. See EARTHNUT; PEANUT.

**Ground Squirrel**, the name of a genus of squirrels, somewhat resembling the marmot. They differ from the common squirrel in that they possess cheek pouches and retreat into burrows. They are well known in America, but species are also found in Asia and Africa. See CHIPMUNK; GOPHER. (See illustration on next page.)



## Grouse

**Grouse**, a group of birds, related to the domestic fowls, of which different species are found in many countries. The grouse usually live on the ground and always nest there. They are shy and almost untamable; they live



GROUND SQUIRREL

during a portion of the year in families and confine themselves to forests and partially barren regions, where they feed on berries, buds, leaves and insects, which they often uncover by scratching. It is their habit to lie hidden until their enemy is almost on them



GROUSE

and then to fly off rapidly with a great whirring of wings. The male birds become fierce in the breeding season and, after dancing and performing various antics before the hens, they fight viciously, the victor mating with the whole flock of hens; but as soon as the females begin to sit, the male leaves them alone to take the entire care of their offspring. Their eggs number from eight to fourteen. The young are very sprightly and leave the nest almost as soon as they are hatched, and on the least alarm they hide themselves skilfully. In the United

## Grunt

States there are a number of different species, chief of which is the *ruffed grouse*, *partridge*, or *pheasant*, as it is called in different localities. This bird is of a brownish color, with a light spotted breast, and like the other grouse it is a trim bird of plump form. On the neck of the male are two large patches of black feathers, which it opens out in a fan-like way at times. The deep throbbing sound produced by this bird regularly in spring and occasionally in autumn is not easily forgotten by any one who has heard it. The ruffed grouse are considered among the finest American game birds and are shot in large numbers by sportsmen every autumn. Most of the states limit to a few months the period during which they may be hunted. The *prairie chicken* is another grouse. It once was exceedingly common in large flocks throughout the Central states, but it has been almost exterminated in many regions of the United States where it was once very numerous. On each side of the neck of the male is a large bare tract, which can be inflated at will, so that it looks like a great orange. The necks are also tufted with long black feathers. The sound the prairie chicken makes is a loud, hollow booming that is almost as peculiar as the drumming of the ruffed grouse. There are a number of different species of the grouse to be found in Europe, where they are favorites with the sportsmen. See SAGE GROUSE.

**Grow**, GALUSHA AARON (1822-1907), an American statesman, born at Eastford, Conn. He removed to Pennsylvania in 1834, graduated from Amherst College in 1844 and was admitted to the bar. In 1850 he was elected to Congress and served twelve years, first as Free-Soil Democrat, then as Republican. He was elected speaker of the House in 1861. Grow was chosen congressman-at-large in 1894 and served until 1903, when he retired.

**Grubber**, a sort of cultivator for tearing and loosening soil and for digging up roots. It consists of an iron framework, with handles and wheels, and is provided with curved *tines*, or teeth. In the most modern kinds the wheels are arranged three in front and two behind. The depth to which the teeth may penetrate is regulated by suitable mechanism.

**Grunt**, an American species of drumfish, also called *pigfish* and *redmouth*. The first of these names relates to the sound it emits when taken out of the water, the last to blood-red marks on the gums, or lips. The *growler*, found off America, also emits a grunting sound.

## Grunter

**Grunter.** See GURNARD.

**Guadalajara**, *gwah'dah lah hah'rah*, a city of Mexico, capital of the State of Jalisco, in the fruitful valley of Atemajac, on the Rio de Santiago. It is a large and handsome city, with a fine cathedral, a university, a mint, several convents, a high school and an art academy. The city contains a library of 24,000 volumes and has a number of literary and scientific institutions. Manufacturing is carried on, the principal products being silversmiths' and goldsmiths' wares, paper, leather, hats, pottery and cloth. Population in 1910, 118,799.

**Guadalquivir**, *gaw'dal kwiv'ur*, a river of Spain, which rises in the frontiers of Murcia, traverses Andalusia from northeast to southwest, passing the towns of Cordova and Seville, and thereafter flowing southwest, falls into the Atlantic. Its course is 250 miles, of which 70 are navigable. It abounds with fish.

**Guadalupe Hidalgo**, *gwah'da loo'pay he-dal'go*, TREATY OF, the treaty between Mexico and the United States, which ended the Mexican War. It was signed February 2, 1848, and was ratified in the following May. By it the Rio Grande was established as the boundary of the eastern portion and the Gila and Colorado rivers in the west. The United States paid Mexico \$15,000,000 and assumed the payment of claims, amounting to \$3,250,000, of American citizens against Mexicans.

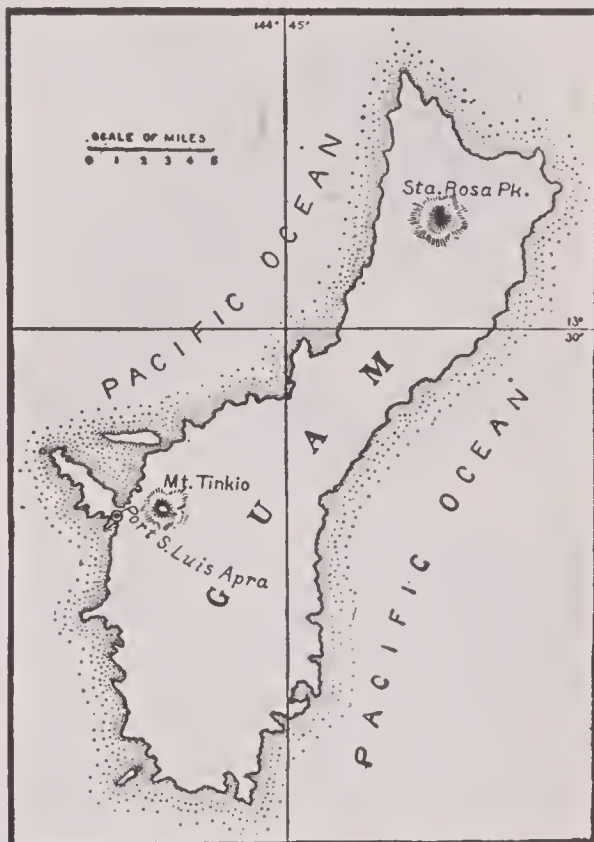
**Guadeloupe**, *gaw de loop'*, an island of the French West Indies, composed of two portions, separated by a narrow arm of the sea, called Rivière Salée. The western and larger portion is Basse-Terre, or Guadeloupe proper, 27 miles long and about 15 miles broad. It is of volcanic formation, the culminating point being La Soufrière, 5018 feet high. The eastern portion, called Grande-Terre, is nearly 30 miles long by 10 to 12 miles broad. It is generally flat and of coral formation. The climate of Guadeloupe is hot and unhealthful, with a humid atmosphere, and hurricanes are frequent and destructive. The soil is fertile and is covered with fine forests. The chief articles of cultivation are sugar, coffee, cacao, bananas and manioc. The chief towns are Basse-Terre, the capital, and Pointe-à-Pitre. After belonging at various times to the English and the French, these islands were ceded to France in 1814. Population in 1911, 212,430.

**Guadiana**, *gwah'de ah'nah*, a river of Spain, which rises in New Castile, flows first northwest, then southwest, into Estremadura; on

## Guanaco

reaching Badajoz it begins to form part of the boundary between Spain and Portugal, and it finally falls into the Atlantic, below the town of Ayamonte. It has a length of about 520 miles, of which only 35 are navigable.

**Guam**, *gwahm*, or **Guajan**, *gwah hahn'*, the largest of the Ladrone Islands in the Pacific, 1500 mi. e. of Manila, discovered by Magellan



in 1521. Agana, the former Spanish capital of the Ladrone, is situated upon this island. It formerly belonged to Spain, but by a treaty at the close of the Spanish-American War, it came into the hands of the United States. It is a naval station and a port of transit between America and Asia. The surface is mountainous and the soil fertile, producing rice, cocoanut and indigo. Population in 1911, 12,240.

**Guan**, *gwahn*, a bird related to the grouse and partridge, a native of Central and South America. These birds, of which there are several species, are easily domesticated and are often seen about native villages, though their natural home is in trees and on the ground, where they feed upon fruits and seeds. They are mainly black in color and have crested heads and long, handsome tails. They usually live in flocks, but separate into pairs during the breeding season. (See illustration on next page.)

**Guanaco**, *gwah nah'ko*, one of the two wild species of the camel family, of which the llama



## Guanajuato

and alpaca are the domesticated varieties. It abounds in Chile and Patagonia, attains a height of nearly four feet at the shoulders and is extremely swift and sure-footed. It is cov-



GUAN

ered with long, reddish, woolly hair, and its skin is much used for clothing and tents. When domesticated its flesh, wool and milk are prized by the natives. See ALPACA; LLAMA; CAMEL.

**Guanajuato**, *gwah'na whah'to*, a city of Mexico, capital of the state of the same name, 165 mi. n. w. of Mexico, is situated in a narrow defile, hemmed in by mountains, at the height of 6800 feet above the sea. It has steep, irregular streets, but well-built houses. The most important buildings are the cathedral, a college, a gymnasium and the mint. The city is located in the vicinity of extensive silver mines. The leading manufactures are silverware, pottery, soap and chemicals. Population in 1910, 35,147.

**Guano**, *gwah'no*, a valuable manure, consisting of the decomposed excrement of sea birds. The largest deposits of guano were formerly on the Chincha Islands off the coast of Peru, but these have been entirely exhausted. Smaller deposits are found on neighboring islands, and Peru is still the chief source of supply. Previous to the Civil War guano was extensively used as a fertilizer, but it has now been almost entirely replaced by cheaper materials. Guano made from menhaden is called *fish guano*, and that made from blood is called *blood guano*. See FERTILIZERS; MENHADEN.

**Guarantee**, *gar an tee'*, in law, an undertaking by which a person binds himself to

## Guatemala

answer for the failure of another. In the United States no person is liable on any special promise to answer for the debt, default or miscarriage of another person, unless a written agreement, or some memorandum in writing for such purpose, shall be signed by the promisor or some other party lawfully authorized by him. It is a general rule that the guarantor shall not be bound beyond the express words of the engagement.

**Guard, NATIONAL.** See MILITIA.

**Guardafui**, *gwahr dah fwe'*, CAPE, next to Ras Hafun the most eastern point of Africa, at the entrance of the Gulf of Aden.

**Guardian**, *gahr'de an*, in law, the custodian of a person incapable of directing himself; especially, the custodian of an infant—that is, a person under twenty-one years of age. A guardian is not allowed to reap any benefit from his ward's estate, but must account for all profits. He can invest the money of his ward in real estate only by order of the court, and he can convert real estate into personality only by a similar order. If he spends more than the interest and profits of the estate in the maintenance and education of the ward, without permission of court, he may be held liable for the principal thus consumed. He is entitled to the care and custody of the person of his ward. Guardianship lasts until the ward has attained majority.

**Guatemala**, *gaw te mah'la*, the most northern republic of Central America, bounded on the n. and w. by Mexico, on the e. by Belize, or British Honduras, the Gulf of Honduras, Honduras and Salvador and on the s. by the Pacific Ocean. The area is 46,800 square miles, and the population is about 2,000,000. The country is mountainous or hilly in most places. A chain of mountains traverses it from the southeast to the northwest, and numerous branches extend from this in various directions. The scenery is noted for its variety and beauty. The mountains contain a number of volcanoes, two of which are considered active. One of these, Agua, has an altitude of 14,890 feet. The climate is tropical, there is an abundance of rain and the country is watered by a number of rivers flowing into the Atlantic and the Pacific. There are also in the mountainous regions a number of lakes. The hills and mountains contain forests of valuable timber. The soil is generally fertile, and agriculture is the leading occupation. The principal crops are corn, wheat, rice, coffee, cotton, tobacco, sugar, cochineal, cacao, indigo,

## Guatemala

vegetables and tropical fruits. Ramie, henequen and other fiber plants are grown to some extent, and coffee is an important article of export. Most of the trade is with the United States and Great Britain. A railway extends from Saint Tomas on the Atlantic to San José on the Pacific coast, passing through Guatemala, the capital.

Most of the inhabitants are indians of Aztec and Toltec descent. Many of them are still uncivilized, and nearly all speak their native tongue. Only about one-third of the population are Europeans or of mixed descent. Considerable attention is paid to education, and children of all nationalities, even in the remote villages, are compelled to attend school. The government is republican in form, the executive officer being a president elected for four years. The important cities are Guatemala la Nueva, the capital; and Puerto Barrios and San José, the most important seaports. See GUATEMALA.

**Guatemala** or **Guatemala la Nueva**, the capital of the Republic of Guatemala, is situated in a plain 160 mi. n. w. of San Salvador. The town occupies a comparatively large area, since, on account of earthquakes, most of the houses are of one story. The chief place of interest is the great square, in which are located the old vice-regal palace, the cathedral, the archbishop's palace, the government offices, several schools, the barracks and most of the stores. The educational institutions include a university, a polytechnic school and a museum. The city maintains public libraries and has a number of hospitals, a national palace and a theater. The manufactures consist of muslins, cotton yarn, embroidery, artificial flowers and silver articles. The city is the chief center of trade for Guatemala and is connected by railroad with Saint Tomas on the Gulf of Honduras and San José on the Pacific. Population in 1910, estimated at 90,000.

**Guava**, *gwah'vah*, the popular name for certain small tropical trees with square branches, egg-shaped leaves and large white axillary flowers. The fruits are fleshy berries, which are usually apple-shaped or pear-shaped. The pulp is of an agreeable flavor, and a delicious and well-known jelly is made from it.

**Guaviare**, *gwah've ah'ray*, a river of Colombia, South America, an affluent of the Orinoco. It rises in the Andes not far from Bogota and flows easterly. It is navigable for most of its length, which exceeds 700 miles.

## Guelder Rose

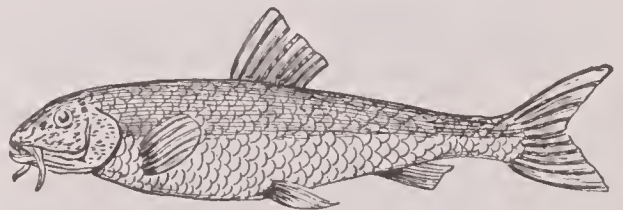
**Guayaquil**, *gwah ya keel'*, or **Santiago de Guayaquil**, a city and the chief seaport of Ecuador, on the Guayaquil River, here about 2 miles wide, about 40 miles above its mouth. Behind the town there is an extensive marsh, which makes the location unhealthy. There



GUAVA

is also a deficiency of water. However, the town is improving, has tramways and telephones and, in the new portion, fine buildings and streets. It has one of the best harbors on the west coast of South America. Its principal exports are cacao (to the value sometimes of \$5,000,000 annually), coffee, ivory, gold, silver, quinine, hides and nuts. Population, estimated at 45,000.

**Gudgeon**, *guh'on*, a fresh-water fish, belonging to the carp family, common in rivers of England. Neither jaw is furnished with teeth, but at the entrance of the throat there are two



GUDGEON

triangular bones, which perform the office of grinders. These fish are taken in gentle streams and measure only about six inches in length. Many are captured in nets for the market.

**Guebers** or **Guebres**, *ge'burz* or *ga'burz*. See GHEBERS.

**Guelder**, *gel'dur*, **Rose**, a name frequently given to the cultivated variety of the high bush cranberry. On account of the shape and color of the flower clusters, it is sometimes called the snowball. The fruit is of a pretty red color.



## Guelph

**Guelph**, *gwelf*, a city in Wellington co., province of Ontario, Can., on the Speed River and on the Grand Trunk and Canadian Pacific railroads. The river here has a fall of 30 feet, and furnishes power for organ and piano factories, flouring mills, iron foundries, woolen mills, rolling mills, sewing machine, furniture and farm implement factories. The surrounding country is agricultural and is also notable for stock raising. The town was first settled in 1827 and became a city in 1877. Population in 1911, 15,175.

**Guelphs and Ghibellines**, the names of two great Italian political factions in the thirteenth and fourteenth centuries. The names are derived from corruptions of the German *Welf* and *Waiblingen*, party designations in Germany in the war between Welf VI of Bavaria and Conrad of Hohenstaufen, to whom belonged the estate of Waiblingen. About the year 1200 the terms Guelph and Ghibelline came to be employed to denote, respectively, the Italian patriotic party, which demanded an Italy freed from German interference, and the imperial party, which supported the domination of the German emperors in Italy. After the fall of the Hohenstaufens, the Ghibellines became the partisans of aristocracy and the Guelphs were the partisans of democracy and liberty; but the designations came in time to denote mere family feuds.

**Guereza**, *ge re'zah*, a species of monkey remarkable for its beauty, inhabiting the mountains of Abyssinia. Short, glossy, jet-black fur covers its limbs, back and head, while a long fringe of silky white hair hangs from the flanks. It frequents lofty trees. See MONKEY.

**Guernsey**, *gurn'zy*, the second largest and most western of the Channel Islands, lying off the north coast of France, 46 mi. from Cherbourg and about 68 mi. s.e. of Start Point in Devonshire. The breeding of cattle and the dairy are the principal objects of attention; and the butter made is considered excellent. The island is especially famous for its fine breed of cows. Horticulture and floriculture also receive much attention, and fruits, especially figs and grapes, are very abundant. The chief towns are Saint Peter Port, the capital, and Saint Sampson. Population in 1911, 43,000.

**Guerriere** *gair yair'*, THE. See CONSTITUTION, THE.

**Guiana**, *ge ah'nah*, BRITISH, a colony in the northern part of South America, about 560 mi. long and about 200 mi. broad, bounded on the

## Guiana

e. by Dutch Guiana, on the w. by Venezuela and Brazil, on the n. and n. e. by the Atlantic Ocean and on the s. by Brazil. Its estimated area is 90,500 square miles, or more than half of all Guiana. It is divided into three settlements, Berbice, Demerara and Essequibo, and Georgetown is the capital of the whole colony. On the western boundary is the singular flat-topped and almost inaccessible mountain Roraima, rising to a height of 8600 feet. The other principal ranges are the Sierra Imataca, in the northern part of the country; the Canucú, or Conocou, and the Sierra Acarai, the last occupying the extreme southeast corner of the territory, forming its boundary in this direction. They are densely wooded, but do not reach a greater elevation than 4000 feet. The chief rivers are the Essequibo, Demerara, Berbice and Corentyn.

The climate, though moist and warm, is not on the whole unhealthful. Cultivation is confined to the coast region; the soil is very fertile, and much of it is well adapted for the sugar cane, the cultivation of which is mostly carried on by Indian and Chinese coolies. Guiana also produces coffee, tobacco, indigo, rice and other tropical plants. Vegetation is singularly luxuriant, and the forest trees are most magnificent. Fruits, medicinal plants, fibrous vegetables and dyeing woods abound. Guiana has two dry and two wet seasons, each continuing for three months; December, January, February, June, July and August constitute the wet seasons; the other months of the year are dry. The mean annual temperature is about 81°. Violent thunderstorms occur at the change of the seasons; but the hurricanes, so destructive in the West Indies, are unknown. The trade is concentrated mainly in Georgetown. Sugar, rum and molasses are the principal exports. The annual exports are about \$10,000,000, and the imports are about \$9,000,000. The government consists of a governor and a court of policy of 15 members; also a combined court, consisting of the court of policy and 6 financial representatives. Guiana was first settled by the Dutch about 1580. It was taken by the British in 1783, in 1796 and again in 1803, and finally it was given up to them. Population in 1911, 296,000, a great proportion being of African race or coolies from India.

**Guiana, DUTCH, or Surinam**, a Dutch colony in South America, situated between British Guiana and French Guiana, with an area of about 46,960 sq. mi. It is flat and swampy on

## Guiana

the coast and is mountainous in the interior. It is well watered by numerous streams, of which the Surinam and its tributaries are most important. The climate is warm and moist and the soil is very fertile. Only a small part of the land is under cultivation. The principal products are sugar, cacao, bananas, rice, maize and coffee, the total exports being valued at about \$2,250,000 annually. On the Surinam River, about 10 miles from its mouth, is situated the capital, Paramaribo. The government is vested in a governor-general and council, appointed by the queen, and an assembly, or States, consisting of four members appointed by the governor and one elected member for each 200 voters. Population in 1911, 86,233.

**Guiana**, FRENCH, or **Cayenne**, a French colony in South America, situated between Dutch Guiana and Brazil and having an area of about 30,500 sq. mi. This territory resembles British Guiana in its physical features, climate and vegetable productions, with the addition, in the latter case, of pepper, cloves, cinnamon and nutmeg. Less than one-third of the country is under cultivation, owing to the peculiarly unfavorable climatic conditions. The colony includes the island of Cayenne, celebrated for the pepper bearing that name. Off the coast is Devil's Island, famous as the place of imprisonment of Captain Dreyfus. Gold has been found in considerable quantities and constitutes the chief article of export. The colony is governed through a governor, appointed at Paris, and a privy council of seven members, besides a representative council of sixteen members. It also sends one delegate to the French Chamber of Deputies. It is held at a financial loss to France. The capital is Cayenne. Population in 1911, 49,009, of whom about 9,000 are convicts.

**Guido D'Arezzo**, *gwe'do dah ret'so*, or **Guido Aretino** (about 995—about 1050), one of the earliest of modern musicians. He was a Benedictine monk, and little is known of his life. He doubtless invented or at least adapted the present musical notation. This achievement secured for him the favor of the pope, who did much to popularize the new system. He probably also introduced the four-line staff, which marks an important step in the history of musical notation.

**Guido Reni**, *gwe'do ra'ne* (1575–1642), a celebrated Italian painter, born at Bologna. Being the son of a musician, he devoted some time to the study of music, but as painting seemed his true vocation, he was placed under the tuition of Denys Calveart. After his twentieth year he

## Guilford

entered the Eclectic, or Bolognese, school of painting and became one of its chief masters. He is particularly noted for the gentleness and sweetness of his characters and for his harmonious style of execution. The color and composition of his paintings are good, but originality and strength are lacking. Among his most famous works may be mentioned his *Aurora*, *Magdalene*, *Michael Vanquishing Satan*, *Lot and His Daughters*, *Fortune* and *Rape of Helen*.

**Guild**, *gild*, a society or association for carrying on commerce, a handicraft or some other undertaking. Such associations have been known from very early times in various countries, and they played a very important part in the Middle Ages. They often formed a bulwark against the oppression of the nobility and were thus conducive to the growth of municipal and civil liberty. In the thirteenth century the German guilds of craftsmen obtained the right of defending by arms their own interests, and they became so powerful that persons unconnected with the trade were often glad to attach themselves to them. With the view of destroying the influence which they had acquired, emperors at different times abolished them by decree, but it was not until late in the nineteenth century that unrestricted freedom to practice any trade was established in Germany. In Great Britain trade guilds long possessed an importance which was mainly political. As the right of voting was involved in the membership of a guild, many persons acquired the rights of "freemen" by connecting themselves with some body of this kind. These guilds, in England, had no legal right to prevent any man from exercising what trade he pleased. The guilds, or companies, of the city of London are still very important corporations, which give relief to poor and disabled members and also manage vast funds bequeathed for benevolent purposes. Many of the trades unions, especially in the United States, have now somewhat of the character of the ancient guilds.

**Guilder**, *gil'dur*. See FLORIN.

**Guilford**, *gil'furd*, or **Guilford Courthouse**, BATTLE OF, a brief but important and hotly-contested battle of the Revolutionary War, fought on March 15, 1781, between an American force under Greene and the British under Cornwallis. At first the British prevailed, and later the Americans, but the battle has been judged by military critics to have been a British victory. The American loss was about 400, and the British, 600. The defeat was changed into a strategic victory by Greene's superb general-



## Guillemot

ship, and Cornwallis retreated to Wilmington and thence into Virginia, where he surrendered.

**Guillemot**, *gil'e mot*, the name of several web-footed birds, belonging to the family of auks. They have straight, compressed bills, covered with feathers as far as the nostrils; short, pointed wings, and short legs, far back under the body. They live principally on fish and build their nests on steep rocks near the sea.

**Guillotine**, *gil lo teen'*, an engine for beheading persons at one stroke, invented during the Middle Ages and adopted by the National Assembly of France during the French Revolution, on the proposal of Dr. Guillotin, after whom it is named. In this apparatus decapitation is effected by means of a steel blade, loaded with a mass of lead. This blade slides between two upright posts, grooved on their inner sides. The victim's neck is confined in a circular opening between two planks, the upper one of which also slides up or down.

**Guilmant**, *geel mahN'*, FELIX ALEXANDRE (1837-1911), an eminent French organist and composer. In 1853 he accepted a position as organist at the Church of Saint Joseph in Bologna, and this was followed by other important appointments, culminating in 1896 in a professorship at Paris Conservatory. He made several highly successful tours of Europe and America, his playing being characterized by wonderful orchestral effects and by brilliant execution and interpretation. Among his compositions for the organ is *Marche funebre et chant seraphique*.

**Guinea**, *gin'ee*, a geographical term applied to a part of western Africa, including the Atlantic coast line and an indefinite area of the interior, between the Senegal and Orange rivers, but now usually restricted to Portuguese Guinea and Angola. As formerly known, Guinea was divided into two districts. That called North, or Upper, Guinea, included Sierra Leone, Liberia, the Grain, Ivory, Gold and Slave coasts, the states Ashantee, Dahomey, Benin; the division known as South, or Lower, Guinea, included Kongo, Angola and Benguela. See PORTUGUESE GUINEA.

**Guinea**, an old English coin worth 21 shillings, or about \$5. Guineas were first coined in the reign of Charles II (1663), of gold brought from Guinea; they bore the figure of an elephant. In 1817 the coin was withdrawn from circulation, being superseded by the sovereign. It is, however, still customary to estimate professional fees in guineas.

## Guise

**Guinea**, GULF OF, that portion of the Atlantic which washes the shores of Upper Guinea, between Cape Palmas and Cape Lopez; it includes the bights of Benin and Biafra. Fernando Po, Prince's and Saint Thomas islands are within this gulf.

**Guinea Fowl**, a genus of pheasants, originally all natives of Africa. The common guinea hen, now well known as a domestic fowl, has a slate-



GUINEA FOWL

colored plumage, varied with round white spots. It is about the size of a common fowl and is of a noisy and quarrelsome disposition.

**Guinea Pig**, a well-known little animal, about six inches long, usually variously spotted with black, white and brown. It is not a pig at all,



GUINEA PIGS

but a cavy, that is, an animal somewhat related to rats and rabbits. Guinea pigs are timid little creatures that feed on vegetable food and breed very rapidly. They make attractive pets for children.

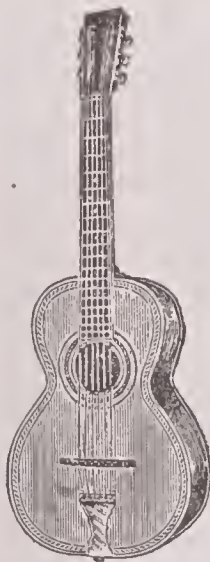
**Guise**, *gweez*, a distinguished ducal family of France, a branch of the House of Lorraine. Several of its members took an important part in French history. The family acquired great political influence on the accession to the French throne of Francis II, who had been married to Mary Queen of Scots, the granddaughter of the first duke of Guise. Among the most famous of the family was FRANCOIS OF LORRAINE, duke of



## Guitar

Guise (1519–1563), who early distinguished himself in war, especially at Metz, which he defended with success against Charles V. Under Henry II and Francis II he was the real ruler of France. On the death of Francis II he was driven from France, but was recalled to take charge of the armies against the Huguenots. He won some successes, but while preparing to besiege Orleans, the central point of the Protestant party, he was assassinated. HENRY I of LORRAINE, third duke of Guise (1550–1588), the son of François, became the leader of the Catholic party on the death of his father and took a prominent part in the wars against the Huguenots. He was a leader in the massacre of Saint Bartholomew, and for sake of revenge he personally conducted the assassins to the house of Coligny. After defeating the allies of the Huguenots, he advanced to Paris, which Henry III, fearing his power, forbade him to enter. He disregarded the command and was received with great enthusiasm by the people, but Henry III, foreseeing the possibility of Guise making himself king, invited him to a conference and had him assassinated.

**Guitar**, *ge tahr'*, a stringed musical instrument, with a hollow body and a neck somewhat similar to that of a violin, used especially to accompany the voice. The modern, or Spanish, guitar has six strings, the three highest being made of gut, the three lowest, of silk, covered with fine wire, tuned respectively to the E in the third space of the bass staff, the A above it and the treble D, G, B and E. The tone is produced by the vibration of the strings, from picking with the fingers, the pitch being regulated by pressing the wire against brass frets in the neck of the instrument, thus changing the length of the vibrating segment.



[GUITAR

**Guizot**, *ge zo'*, FRANÇOIS PIERRE GUILLAUME (1787–1874), a French historian and statesman. His father, a lawyer, having in 1794 perished by the guillotine, his mother and her three sons retired to Geneva, where François was educated at the gymnasium. In 1805 he commenced legal studies at Paris, but gradually drifted into the literary profession. In 1812 he married Mlle. de Meulan, editor of the *Publiciste*, and in the same year he became professor of history at the Sorbonne. On the fall of the Empire he

## Gulf Stream

obtained several public offices, such as counselor of state and director-general of the departmental and communal administration. He lost his offices and his position at the Sorbonne, on account of his openly expressed political principles, but in 1829 he was permitted to resume his lectures. After the July revolution of 1830, he was appointed minister of the interior, but resigned in 1831. After the death of Périer, Guizot, along with Thiers and De Broglie, formed a coalition ministry, and he rendered great service as minister of public instruction. He became ambassador at the British court in 1840, and in the next year he became the real head of the government of which Soult was the nominal chief. He retained the office of minister of foreign affairs until 1848, and during that period he opposed all measures of reform. After the fall of Louis Philippe, Guizot escaped and fled to England. Henceforth he practically retired from public life. Among his numerous works may be mentioned *The History of Civilization in France*, *General History of Civilization in Europe*, *History of the English Revolution*, *Washington* and *The History of France from the Earliest Times to the Year 1789*.

**Gulden**, *gool'den*. See FLORIN.

**Gulf Stream**, one of the most celebrated of the oceanic currents, so called because it issues from the Gulf of Mexico. It owes its origin to the fact that the westward-moving waters of the tropical portion of the Atlantic, encountering the eastward projection of South America, become divided into two currents, one setting southward along the Brazilian coast, and the other northward past the mouths of the Amazon and Orinoco, into the Caribbean Sea. It enters the Gulf of Mexico and thence emerges through the channel of Florida as the Gulf Stream. Its course is next to the north and eastward, in a direction parallel to the coast of the United States, past Cape Hatteras, along the southern edge of the "great banks" of Nantucket and Newfoundland, after which it loses identity as a distinct current.

In the earlier part of its course, especially when rounding the extremity of Florida, the Gulf Stream forms a well-defined current, distinguished by its high temperature and its deep blue or indigo color. On account of the descent of the Polar, or Baffin Bay, current along the coast in a direction opposite to that of the Gulf Stream, the water on its inland side is colder than that to the eastward of it. The difference of temperature between the Gulf Stream and

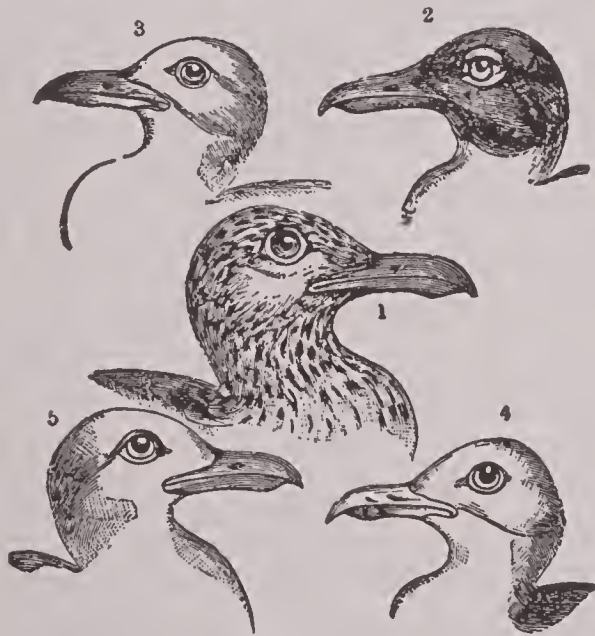


## Gulls

this cold current sometimes amounts to 20° or 30° F. The velocity of the Gulf Stream varies with its course. Within the Florida channel it attains a mean velocity of sixty-five miles per day; this sinks to fifty-six miles off Charleston, becomes thirty-six miles to forty-six miles off Nantucket and twenty-eight miles to the south of the Newfoundland Banks; three hundred miles to the eastward of Newfoundland its movement is hardly perceptible.

At the bottom of the Florida channel the observed temperature is 34°, that of the surface from 80° to 84°. Geographers have greatly exaggerated the influence of the Gulf Stream on the temperature of Europe. If it possesses any *direct* influence, such must be extremely small, as the current is both too narrow and too shallow, and its slight amount of superior heat probably vanishes after it has passed Cape Hatteras. The relatively high temperature of western and north-western Europe must rather be referred to the general set of the tropical waters to the north-east, and to the warm winds blowing in the same direction. See CURRENTS, MARINE.

**Gulls**, birds that live along the seacoast and on the waters of the interior, in almost all parts



GULLS

1. Great black-backed; 2, black-headed; 3, kittiwake; 4, lesser black-backed; 5, herring gull.

of the world. They are very graceful on the wing and are seen usually in large flocks, feeding on every kind of animal food, putrid or fresh, which they can find. They catch fish with great skill, but are quite content to follow ships or to hang about harbors, gathering in the refuse from sewers, buildings and shipping. There

## Gum Resins

are a great many species, many of which resemble one another so closely that the ordinary observer cannot distinguish them. Their prevailing colors are white or bluish-gray, but black, slate color and brown are mixed in various ways in some species. The *great black-backed gull*, the *herring gull*, the *laughing*, or *black-headed*, gull, *Bonaparte's gull* and the *kittiwake gull* are common American species. The *lesser black-backed gull* belongs to Europe.

**Gum**, a substance of various properties, which exudes spontaneously from the bark of certain trees, such as the plum and the peach, or from the incisions made in the bark to facilitate the flow. Gums form non-crystalline, rounded drops, or tears, the purest varieties being transparent or translucent, usually pale yellow, but sometimes of a dark color. When dissolved in water, gum forms a thick, smooth fluid, which is more or less sticky. Some gums, such as gum arabic, dissolve in water; others, like tragacanth, are only partially soluble; all are insoluble in alcohol and are thus distinguished from resins. They have no odor and only a very faint taste. The different kinds of gum receive their names from the countries from which they are imported—such as gum arabic, gum Senegal, Barbary gum and East India gum; and from individual features—as cherry-tree gum and tragacanth. *Gum resins* require water and alcohol to dissolve them. See GUM RESINS; RESINS.

**Gum Arabic**, a yellowish or reddish gum, gathered from several species of acacia trees that grow in Asia and northern Africa. It is used in thickening ink and in making mucilage and pastes. See MUCILAGE.

**Gumboil**, an abscess in the gum, generally the result of toothache or of the presence of decayed teeth or stumps. The decayed tooth or stump, if the inflammation proceeds from this cause, should be removed; the boil should be opened, and the mouth should be washed frequently with tincture of myrrh and water.

**Gum Resins**, *rez'inz*, solidified juices obtained from plants. They contain a gum, which is soluble in water, and a resin, which dissolves in spirits, so that the body usually is nearly soluble in dilute alcohol; but there are usually present, in addition, essential oil and a variety of impurities. The gum resins have frequently a strong and characteristic taste and smell. They are solid, opaque and brittle. They are used chiefly in medicine. The common gum resins are aloes, asafoetida, gamboge and myrrh. See GUM; RESINS.

## Gumti

**Gumti**, *gum'te*, or **Goom'ti**, a river of Hindustan which rises in the Northwest Provinces and, flowing southeasterly, falls into the Ganges near Benares. In its course it passes the cities of Lucknow and Jaunpur. Its length is about 500 miles.

**Gun.** See CANNON; RIFLE; SMALL ARMS.

**Gunboat**, a term applied to small war vessels, mounting usually a single gun and employed in coast defense or in attacking large and heavy armored vessels. Some gunboats are armed with one heavy deck gun, which can be turned in any direction by means of a pivot. In others the single gun is placed on a platform, which can be raised to the deck or lowered to the hold by a donkey engine. The gun in this case does not turn on a pivot, the maneuvering being effected entirely by the turning of the vessel. Steam gunboats, especially when iron plated, are most powerful auxiliaries to a fleet.

**Gun Carriage**, the structure on which a cannon is mounted and on which it is fired. Gun carriages are of various forms. In the case of a field or siege piece, the carriage is united, for traveling, with a two-wheeled forepart, termed a *limber*, to which the horses are attached, so as to form a single four-wheeled carriage. In action the gun is unlimbered and then rests on its pair of wheels and on a strong support, termed the *trail*. A gun in a fortress has its carriage commonly mounted on what is termed a *traversing platform*, that is, a strong framework, supported on metal trucks or small wheels. These trucks are constructed to run on metal rails, which are laid in concentric arcs of circles, whose center is a real or imaginary pivot close to the mouth of the embrasure through which the gun fires. By this means the muzzle of the gun, when run up, is brought nearly over the pivot, so that the direction of its fire may be changed considerably in lateral directions and yet allow of a very narrow embrasure. Carriages on the "disappearing principle" are visible to the enemy only during the acts of aiming and firing. The loading is effected under shelter. In one of these the carriage is so contrived that a heavy counterweight attached to it is sufficient to raise the gun into the position for firing, the sides of the carriage having some resemblance to the "rockers" of a rocking-horse. The recoil brings the gun down into the loading position, after which it is again brought into firing position as before. The iron carriages now made are thus elaborate mechanical structures. In mortars a cast-iron bed takes the place of a carriage.

## Gunpowder Plot

**Guncotton** or **Pyrox'ylin**, a highly explosive compound, made by soaking vegetable fiber in a mixture of nitric and sulphuric acids and allowing it to dry. Cotton is the fiber generally used, hence the name *guncotton*. Guncotton is used in the manufacture of celluloid, collodion and varnishes. Military guncotton is highly explosive and is used for charging torpedoes and in exploding mines. A form of guncotton known as *pyrocellulose* is used by the United States navy in making smokeless powder.

**Gunpowder**, an explosive, consisting of a mixture of saltpeter, sulphur and charcoal. The origin of gunpowder is unknown. It was used by the Chinese before the beginning of the Christian era, and it was known to the nations of Europe in the thirteenth century; but it did not come into general use in war until the sixteenth century.

The first essential in the manufacture of gunpowder is purity of materials. The saltpeter is purified by dissolving it in hot water and allowing it to crystallize. The sulphur is purified by distillation, and the charcoal is obtained by burning willow or alder in cast-iron retorts. Each of these substances is ground to powder; then all three are mixed in the proper proportions in revolving cylinder. The mixture is then moistened and ground between heavy stone rollers. The lime thus produced is sent to a hydraulic press, where it is subjected to different degrees of pressure, according to the grade of powder desired. A high pressure produces powder that burns quickly and has a high explosive power, while a low pressure gives a slow-burning powder. As the mass, called the *press cake*, leaves the press, it goes to the granulating machine, where toothed rollers break it into grains of various sizes, which are sorted by a series of screens. The powder is then polished by being placed for several hours in revolving wooden barrels. After this it is dried and is ready for use. The powder used in rifles is more highly explosive than that used for blasting and in cannon. Blasting powder contains 70 parts saltpeter, 18 parts sulphur and 12 parts charcoal. That used in cannon contains 75 parts saltpeter, 15 parts sulphur and 10 parts charcoal. Smokeless powder, dynamite and other explosives have largely replaced powder for many purposes. See BLASTING; DYNAMITE; SMOKELESS POWDER.

**Gunpowder Plot**, a conspiracy formed in England in the reign of James I, by some



## Gurnard

Roman Catholics, to put to death the king and Parliament, by wrecking the House of Parliament by an explosion of powder, in order to be revenged on the government for the severities against their religion. The plot originated with Robert Catesby, Guy Fawkes and others, and the time fixed for its execution was November 5, 1605, when Parliament was to be opened by the king in person. The plot was discovered by means of a letter sent by one of the conspirators to a relative of his, a Catholic peer in favor with the court, warning him not to be present at the approaching meeting of Parliament. Fawkes, with several others, was tried at Westminster and put to death.

**Gunter's Chain.** See CHAIN.

**Gur'nard, Sea Robin** or **Grunter**, a family of fishes of which there are about forty known species, living in tropical waters. They are remarkable for having three finger-like appendages on the under side, which serve as organs of locomotion as well as of touch. On being taken out of the water they make a grunting noise. One strange species is the *flying gurnard*, or *sea bat*, remarkable because of its enormous spreading wings. It is found along the eastern coast of the United States and around the southern coast of South America.

**Gustave V** (1858– ), king of Sweden and son of Oscar II, came to the throne in December,



GUSTAVE V

1907, on the death of his father. The new queen was Princess Victoria of Baden and is cousin

## Gustavus

of Emperor William of Germany. During the years before his accession Gustave frequently acted as vice-regent, filling the position with such capability as to assure his success as king.

**Gustav'us I**, commonly called **Gustavus Vasa** (1496–1560), king of Sweden. He was the son of a Swedish noble, served in the struggle for Swedish independence, was treacherously carried off with other Swedes by the king of Denmark and was kept a prisoner in Jutland for more than a year. At length, however, he escaped, reached, after many dangers, Dalecarlia, where he roused the peasants to resist Danish oppression, defeated the Danes, took Upsala and other towns and in 1523 was elected king. In 1529 he procured the abolition of the Roman Catholic religion in Sweden and established Protestantism. During his long reign Sweden made great progress in commerce and civilization.

**Gustavus II Adolphus** (1594–1632), king of Sweden, a grandson of Gustavus Vasa, came to the throne in 1611. He was trained to war under experienced generals, took his place in the state councils at the age of sixteen, and was in command of the army in his seventeenth year during the war with Denmark, by which Sweden recovered important possessions on the Baltic. He then turned his arms against the Russians and drove them from Ingria, Karelia and a part of Livonia, which were secured to him by the peace of Stolbova in 1617. His first great war was that with Poland, which lasted nine years and was concluded favorably for Gustavus in 1629. His attention was then diverted from northern wars by the affairs of Germany. The oppression of the Protestants by Ferdinand II excited his sympathy, and the progress of Wallenstein alarmed him; perhaps, too, he was moved by ambition for foreign conquests. He embarked for Germany in 1630, landed near the mouth of the Oder and in a short time had seized nearly all of Pomerania. After taking many fortified towns, defeating the imperial generals at Leipzig, Würzburg, Breitenfeld and the Lech and conquering a great part of Germany, he was killed in the Battle of Lützen, in which, however, his army was victorious (See THIRTY YEARS' WAR). Though a severe disciplinarian, he was beloved by his soldiers, and the prestige of success derived from his victories lasted long after his death.

**Gustavus III** (1746–1792), king of Sweden, succeeded to the throne in 1771. Finding the country weary of the misrule of the nobles, he

## Gustavus

gained the good will of the army, surrounded the States-General and forced them to accept a new constitution, which much restricted their privileges. In 1788 he took command of the army against Russia and Denmark, but he accomplished nothing of importance. On the outbreak of the French Revolution he made strenuous exertions to form a coalition between Russia, Denmark, Sweden and Spain, but, while he was making his preparations, a conspiracy of the nobles was formed against him and he was shot at a masked ball.

**Gustavus IV Adolphus** (1778-1837), king of Sweden, son of Gustavus III, whom he succeeded in 1792. On assuming power Gustavus showed that he had inherited his father's hatred of the principles of the French Revolution, which he carried to the extent of fanaticism. After the Peace of Tilsit he exposed himself to a war with Russia while he was at war with France, by refusing to join the Continental blockade and by opening his ports to England; and in 1808 he quarreled with England, his only ally. Finland was lost to Sweden, and in 1809 a revolution took place, in which Gustavus was dethroned, and his uncle, the duke of Sudermania, was proclaimed king as Charles XIII.

**Gutenberg**, *goo'ten berK*, JOHANNES (1400-1468), the inventor of printing with movable blocks. His original name was Johann Henne Gensfleisch; Gutenberg was probably his mother's family name. Of the details of his life, apart from the invention which has immortalized him, but little is known with certainty. He was born in Mainz of noble family and was a prominent man in his native city until, in about 1420, he was with others obliged to leave, on account of political dissensions. Several years after his departure from Mainz, he was employed in Strassburg on mechanical works. In 1448 Gutenberg was again in Mainz, and two years later he formed a partnership with Johann Faust, or Fust, a money lender, who was to furnish the capital for carrying on the business of printing. After five years Faust sued for money advanced and got possession of most of the printing outfit. As Gutenberg's name did not appear on any of his printed works, it has been difficult to identify them, but he is known to have printed several religious books. During the last years of his life he was a courtier at the court of Archbishop Adolphus. Statues have been erected to his honor in many cities, among which is one by Thorwaldsen, erected in 1837 in Mainz.

## Gutta-percha

Faust and his son-in-law, Peter Schöffer, continued the business and claimed the credit of the invention, but the latter's son, Johann Schöffer, states in a preface of 1505 that the "admirable art of printing was invented in Mainz in 1450 by the ingenious Johann Gutenberg and was subsequently improved and handed down to posterity by the capital and labor of Johann Faust and Peter Schöffer." Gutenberg's claim to the invention has been strongly contested in favor of Coster, but it now seems to be established. By his invention the letters were separated, and the use of movable blocks was possible for the first time. See PRINTING.

**Guth'rie**, OKLA., the county-seat of Logan co. and formerly capital of the state, 32 mi. n. of Oklahoma City, on Cottonwood Creek and on the Missouri, Kansas & Texas, the Santa Fé and other railroads. The city was laid out and settled in 1889, on the day that the territory was opened for settlement, and was the capital from 1890 to 1911. It developed rapidly and now has an extensive trade. The factories include cottonseed oil, lumber and flour mills, foundries and machine shops, furniture and carriage works. The principal buildings are the capitol, the city hall, the Carnegie library, a Federal prison, a Scottish Rite Temple, Saint Joseph's Academy and several other schools. Population in 1910, 11,654.

**Gutta-percha**, *gut'ta pur'cha*, (a Malay name meaning *gum tree*), a substance resembling india rubber in many of its properties, but stronger, more soluble and less elastic. It is the milky juice of certain trees found in Malacca, Borneo and other islands of the Indian Archipelago. When pure, gutta-percha is of a brownish-red color. Below the temperature of 50°, it is as hard as wood and excessively tough. By an increase of heat it becomes more flexible, until, at a temperature of 115° F., it becomes pasty, and between this and 140° or 150° it may be molded into all varieties of forms with the greatest ease, retaining precisely the same form as it cools and hardens to its previous state of rigidity. It is insoluble in water, is soluble with difficulty in ether and other rubber solvents, but mixes very readily with oil of turpentine and naphtha. It is not attacked by solutions of alkalis nor by hydrofluoric acid, but it is acted on by sulphuric, nitric and hydrochloric acids. Gutta-percha has been applied to a variety of purposes, as a substitute for leather, especially in the soles of shoes and



other articles; as an insulating coating for the copper wires of submarine telegraph cables;



GUTTA-PERCHA

as an ingredient in mastics and cements; for the manufacture of flexible hose tubes and bottles, and for many other purposes.

**Gutzkow**, *goots'ko*, KARL FERDINAND (1811–1878), a German writer, born in Berlin. After studying theology he took to journalism and politics and became the leading spirit of a small body of reformers known as “Young Germany.” In 1835 his first novel, *Wally, the Skeptic*, appeared. It was at once declared by the government to be hostile to religion and society, and the author was imprisoned for three months. Besides this important novel, he wrote two others, *The Knights of the Soul* and *The Magician of Rome*, which attained wide popularity and influence. He was active, also, in dramatic literature, his dramas *Richard Savage*, *Uriel Acosta*, *Queue and Sword* and *The King's Lieutenant* having been very popular.

**Guyot**, *ge o'*, ARNOLD (1807–1884), a Swiss-American geographer and physicist, born near Neuchâtel, Switzerland. He studied theology at Berlin, then took up natural science and became professor of history and physical geography in the Academy of Neuchâtel. He shared in Agassiz's investigations of glacier phenomena of the Alps. In 1848 he came to the United States and delivered lectures in Boston, after-

ward published under the title *Earth and Man*, and used extensively as a text-book on physical geography. He rendered much service to meteorological science in connection with the Smithsonian Institution. In 1855 he was appointed professor of geology and physical geography in Princeton.

**Gwalior**, *gwah'le or*, a city and fortress of Central India, capital of the State of Gwalior, situated 65 mi. s. of Agra. The fortress is the largest, the strongest and the most magnificent in India. It stands on an isolated rock about 350 feet high and nearly perpendicular in the upper part. The fortress contains wells and reservoirs of water and is inaccessible except by steps up the side of the rock. Old Gwalior, the town at the northern angle of the base of the rock, is built of stone and has some remarkable ruins of temples, besides an interesting example of old Hindu palace architecture. The new town, known as New Gwalior, or Lashkar (the camp), the residence of the ruler, Maharajah Sindhia, has sprung up recently on the southeast skirt of the rock, but it is already a flourishing city, with a population of 46,900.

The State of Gwalior, politically under the protectorate of the British government of India, consists of several portions of territory, otherwise known as Sindhia's Dominions, the largest and most compact portion, usually known as Gwalior, being the one containing the above town and fortress. The total area is 29,047 sq. mi. It is not as a whole very fertile; one of its most notable products is opium. Population in 1911, 3,090,798.

**Gymnasium**, *gim nah'ze um* or *jim na'ze um*, a term applied in Germany to a class of schools occupying a middle place between elementary schools and universities. The gymnasia are the feeders of the universities, and the training adopted in them is specially intended to equip the pupils for entering these institutions. The last, or exit, examination, to show whether the pupils are fit to enter the university, is very severe and includes history, Latin and Greek and at least one modern foreign language.

In the United States the word is usually applied to a building or room equipped for exercise and athletic uses. Gymnasiums are attached to almost all schools and colleges, and in many cities various clubs and societies support them. Many of the larger high schools have fine rooms, abundantly equipped with varied apparatus, where the pupils take regular and systematic exercise under trained instructors.







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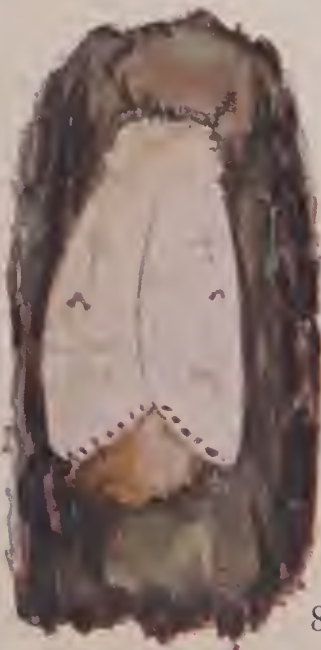
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## BROWN TAIL MOTH

1A Egg Mass and Moth laying eggs  
2A Winter nest  
3A Full grown Caterpillar  
4A Male Pupa

5A Female Pupa  
6A Male Moth  
7A Female Moth

## GYPSY MOTH

1B Egg Mass  
2B Full Grown Caterpillar  
3B Female Pupa  
4B Male Pupa

5B Male Moth  
6B Male Moth at rest  
7B Female Moth  
8B Female Moth laying eggs

## Gymnastics

In the crowded districts of many large cities, open-air gymnasiums, where children may amuse themselves, are now being established and equipped with swings, bars, rings, trapezes and other simple and inexpensive apparatus. See ATHLETICS.

**Gymnastics**, *jim nas'tiks*, the technical term used to designate any system of exercises specially designed to promote the development of physical and, especially, muscular powers. An excellent gymnastic training is given by baseball, football, rowing and similar amusements, but the special value of formal gymnastic exercises is that they are capable of being scientifically arranged so as to secure not only a general development of muscular power, but also to give suitable training to the separate muscles. Furthermore, they are capable of being applied to each person so as to meet, allow for and, as far as possible, overcome defects in his physical organization. For these purposes an elementary course of gymnastics is of great value to all, especially to the person of sedentary habits.

Two general rules may be laid down, which form an efficient guide in self-imposed exercises. The first is the universal rule in mechanics, that the strength of any machine is the strength of its weakest part; the second is the fundamental law of muscular exercise, that it is exercise *within* the extreme power of a muscle which develops and improves, while *straining* a muscle weakens and injures it, and excessive exercise develops particular muscles at the expense of the general health. It is quite possible, indeed, to carry general physical exercises too far, and to develop muscular power at the expense of vital strength. Till the age of twelve the ordinary games and pastimes of childhood are generally quite sufficient exercise; after that some very light system of gymnastics may be adopted to aid the development of the system. After the age of thirty-five, unusual muscular efforts are apt to leave persistent strains, and moderate exercise becomes the safest means of developing and giving tone to the muscular system.

**Gypsies**, *jip'siz*, a wandering nation, whose physical characteristics, language and customs differ much from those of European nations. They call themselves Rommany, from *rom* (man). The gypsies are now considered to have come from India, the main body of their language, though mixed with a great number of borrowed words, having a close affinity with some of the Indian languages. Gypsies are

## Gypsy Moth

remarkable for the yellow-brown or, rather, olive color, of their skin, the jet-black of their hair and eyes, the extreme whiteness of their teeth and, generally, the symmetry of their limbs. The typical gypsies rarely settle permanently anywhere, but live in tents, wandering about working in wood and iron, making domestic utensils, telling fortunes and practicing tricks. Their talent for music is remarkable, and some of their melodies have become the much-valued property of other nations or are incorporated in some favorite operas. They have no stated religion. The marriage ceremony is of the simplest kind. If the husband becomes tired of his wife, he will turn her off without a qualm. The children grow up in idleness and acquire the habits of stealing and cheating. In England the gypsies first appeared about the beginning of the sixteenth century and, notwithstanding severely repressive enactments on the part of the government, continued to maintain themselves as tinkers and mat and basket makers. Considerable numbers of the British gypsies have emigrated to America, where they settle among the people and lose their distinctive characteristics. There are probably about a half million in southeastern Europe, but their numbers are everywhere decreasing.

**Gypsum**, *jip'sum*, the name generally given calcic sulphate. It is found in a compact state as *alabaster* (See ALABASTER), or crystallized as *selenite*, or in the form of a soft, chalky stone, which in a very moderate heat changes to a very fine white powder, extensively used under the name of plaster of Paris. This last is the most common and is found in great masses near Paris; large beds are also found in Nova Scotia, Virginia, Michigan, New York, Iowa and Ohio. It may be geologically of any age, but it occurs abundantly in the more recent sedimentary formations and is even now forming, as a deposit from water holding it in solution; from the decomposition of iron pyrites; when the sulphuric acid combines with lime, or from the action of sulphurous vapors in volcanic regions on rocks containing lime. When gypsum occurs without water it is called *anhydrite*, but in its most ordinary state it is combined with water. Gypsum, pulverized by grinding or burning, has been used with good effect as a fertilizer, especially as a top dressing for meadows. See FERTILIZERS.

**Gypsy Moth**, an insect which has long been exceedingly destructive to fruit and shade trees in central Europe, and which in 1869 was intro-



## Gypsy Moth

duced into America by a man who was experimenting to find a silkworm which would be free from disease. Some of his specimens accidentally escaped, and although he called the attention of the public to the fact, yet the matter was neglected until about twenty years later, when their ravages became so severe that the legislature of Massachusetts was compelled to take action to exterminate them.

The male moth is described as brownish-yellow, varying to greenish-brown in color, with a slender body and an expanse of wings ranging from one to one and one-half inches. The wings are darker than the body and have prominent black markings. The flight is characterized by a peculiar zigzag motion, which assists in identifying the insect. The body of the female is light buff and covered with hairs which are used by the moth to protect the eggs when they are deposited. The wings have an expanse of nearly ten inches, and are nearly white, with small black markings. However, because of the large size of the body, the female is unable to fly.

The eggs are deposited in July and August in clusters about three-fourths of an inch wide and an inch and a half long, forming a yellowish hair-covered mass. The clusters vary in size and contain from 75 to 1000 eggs.

The eggs hatch about the first of May and the larvae or caterpillars feed upon the foliage of fruit and shade trees until mid-summer, when they enter the pupal state. The caterpillars are hairy, and when full grown have a sooty-colored body, containing on the back a double row of red spots. The head is yellow. Before they are half grown the caterpillars frequently suspend themselves from branches of trees and drop upon animals and carriages, by which they are taken to localities not previously infested. The sudden appearance of these caterpillars in such localities may often be accounted for in this way.

The caterpillars prefer the leaves of the oak,

## Gyroscope

the willow, the elm and the apple tree, but they will feed upon the foliage of all fruit and shade trees, and when other sources of food fail, will attack vines, shrubs and even garden and field crop in their vicinity. They even attack the white pine, and in some localities have caused the destruction of many of these trees.

The best method found for destroying the growing caterpillars is by spraying the trees with a solution of arsenate of lead, using ten pounds of arsenate to one hundred gallons of water. The spraying is most effective when done in May and June. The egg clusters can be killed by soaking them thoroughly with a creosote mixture. This work can be done effectively between August and May. Banding the trees with strips of burlap or other coarse cloth, in such a manner that the bands fold over and form a shelter for the caterpillars, is a good means of destroying large numbers. The caterpillars crawl under the folds during the night and the bands should be examined daily. At the end of the season the bands should be burned. Infested areas should be cleared of all brush, and hollow trees and untilled lands where egg clusters are supposed to exist should be burned over.

**Gyroscope**, *ji'ro skope*, an instrument for showing certain properties of rotation. It consists of a circular disk with a heavy rim, mounted upon an axis so that it will revolve with the least possible resistance. In the complete gyroscope, this axis is also mounted in a circular frame, which can be rotated in a direction at right angles to that of the disk, and the entire apparatus rests upon a circular standard, so that it can be turned in any direction. When revolving rapidly the disk is not easily moved out of its plane of rotation, and the axis retains its same direction, though the gyroscope be moved around a circle. For this reason the apparatus is sometimes used to explain the continual pointing of the earth's axis in the same direction. Small gyroscopes are used as toys.



**H**, the eighth letter of the English alphabet, is derived in form from the Phoenician character, which was but an *H* closed at top and bottom with a line. In sound, the Phoenician letter resembled the German *ch*, but in early Greek it corresponded nearly to our *h*. *H* in English is called the *aspirate*, as it is a mere breathing, with the vocal organs in the position demanded by the following vowel. It is very commonly joined to other consonants to represent sounds for which there are no special letters in the alphabet, as in *ch*, *sh*, *th*, or in other consonantal combinations, as in *enough*, *plough* or *philosophy*.

**Haakon**, *haw'kon*, the name borne by six Norwegian kings in the Middle Ages. It was adopted by Prince Charles of Denmark, who came to the throne of Norway in 1905 as Haakon VII. HAAKON VII (1872- ) is the son of Frederick VIII of Denmark, and his wife is the



HAAKON VII

sister of George V of England. King Haakon was trained in the royal navy and his love for and knowledge of the sea had much to do with making him popular with the sea-loving Norwegians. See NORWAY, subhead *History*.

**Haarlem**, *hahr'lem*, a town of Holland, capital of the province of North Holland, 10 mi. w. of Amsterdam. It is well built and is one of the most attractive cities in Holland. Among the chief structures are the cathedral of Saint Baro, the townhall, a library and several churches. The industrial importance of Haarlem, as well as its population, is less than what it was formerly. It still has various manufacturing establishments and a celebrated type foundry, the oldest and most famous printing office in Holland; and its flower trade, especially in hyacinths and other bulbs, is very important. It is the birthplace of Laurence Coster, believed by the Dutch to be the inventor of movable types (See PRINTING), and of a number of painters, Ostade, the Wouvermans, Ruisdael and Van Loo. Haarlem took a leading part in the revolt of the Netherlands and in 1572 was besieged by the Spaniards, to whom it surrendered after a heroic siege of seven months. In 1577 the city became a part of the Netherlands. Population in 1911, 69,988.

**Ha'beas Corpus**, in law, a writ addressed to one who has a person in custody, commanding him to produce the body of the person named at a certain place and time. It is usually employed to secure the trial of the question as to the lawful imprisonment of one who claims to be innocent. The protection of *habeas corpus* is secured to American citizens by the Constitution of the United States and by the constitutions of most of the states. The state courts do not discharge persons imprisoned by order of Federal courts, nor will the Federal courts interfere with persons imprisoned under state process.

In times of rebellion or disturbance the government may find it necessary to arrest dangerous persons and to detain them in custody without bringing them to trial. In such cases, the Constitution provides, the privilege of the writ may be suspended. Whether the power of suspension rests with the president or with Congress has long been disputed, the latter opinion being probably correct. During the Civil War, the



question aroused great interest when President Lincoln suspended the privilege by proclamation. His act was later legalized by Congress. See WRIT.

**Hab'it**, a customary act of body or mind, particularly one that has become so firmly fixed by repetition that it is performed automatically, involuntarily and sometimes unconsciously. Habit is the result of the tendency of the nervous system to act again in the way it has acted before. No satisfactory explanation of this tendency has been found, but physiological psychologists agree that it is due to some change which the act produces in the nerves acted upon. The character of the change is not understood. The theory is that when a current of nerve force once traverses a nerve tract, it produces such a condition in that tract as to make it easier for the current to traverse it again, and that the more times the current traverses the tract, the easier its passage becomes, until the nerves become so habituated to the passage that the only volition necessary to the act is that which starts it.

As bodily habits are formed by repeated muscular movements, so are mental habits formed by repetition of the same mental act. This is what is meant by saying that any mental power, as memory, imagination or will, is developed by use. The person whose memory is well trained during childhood has a good memory through life; likewise, one whose will has received proper culture before he is twenty years of age, has developed a power of decision and action that will usually assure him success in his chosen occupation.

All acts which become habits first occur as reflex or impulsive acts, and their performance is usually unconscious, though one becomes conscious of them after they have been performed. By repetition attention is called to these acts, and the desire to imitate causes the child voluntarily to attempt them. If the act is complex, his first attempts are attended with a considerable degree of effort, as in learning to walk. Here the former reflex and impulsive movements of the limbs are placed under control of the will for a definite purpose, and for some weeks the successful accomplishment of the act requires the child's entire attention every time he attempts it. But day by day the nerve currents traverse the required tract more easily and require correspondingly less attention, until finally the movement becomes automatic and the child sometimes becomes so absorbed in other matters that he is unconscious of the fact that he is walking and travels past the point where he intended to stop.

During childhood and youth the nervous system is in a plastic condition and can easily be trained in any direction; hence it is during this period that most of the habits of life are formed. It is therefore all-important that early habits be such as will contribute to the individual's highest good—physical, intellectual and moral. In order that this result may be secured, the child should be trained to do things in the right way, to speak correctly and to choose the right. After twenty, important habits are seldom formed, and after thirty, new habits are acquired with great difficulty. In order that a habit may be formed, success should be secured at the outset. Failure leads to discouragement and often to the abandoning of the attempt. When the choice is made and the habit is once launched, every opportunity to practice it should be embraced until it becomes firmly established. All acts or thoughts which tend to interfere with the formation of the habit should be set aside.

Habit saves time and strength. Were each successive act as difficult as the first, the most common and necessary movements would consume all one's vitality and one could never make progress. By making our common acts habitual, the mind is left free to exercise its powers on higher things. Were it not for this, memory, reason and will would never be properly developed and that progress of thought which has produced our present civilization would have been impossible. Habit also gives us skill in execution. It is only as we become unconscious of the movement and fix our attention upon the result that we execute our work skilfully. Habit is the great conservator of society. It keeps the various classes of people at their chosen vocations. The miner cannot easily become a mechanic, nor the merchant a physician, and whatever longing a man may have for another calling, after he has become thoroughly established in a given occupation he seldom changes. Habit is the result of will power and determines character. "A well-trained nervous system is the greatest friend that the mind can have. An ill-trained nervous system is a relentless enemy to the highest mental powers." See WILL. Consult Radestock's *Habit in Education*; James's *Psychology, Briefer Course*; Halleck's *Education of the Central Nervous System*.

**Habsburg**, *hahps'boorg*, HOUSE OF. See HAPSBURG, HOUSE OF.

**Hack** or **Hackney Coach**, a term loosely applied to a carriage used for hire. *Hack* is derived from hackney coach, and in the United

## Hackberry

States the term usually means the same as cab.

**Hack'berry**, also called nettle trec, sugar berry and hoop ash, the name of a number of trees which belong to the same family as the nettles and which are found in various parts of the northern hemisphere. The best known species is a large tree which grows in the Western United States. It has a rough bark and nearly horizontal branches, and it may be used in much the same way as the elm. There are two species, of which the smaller, more generally known as the sugar berry, grows in the southwestern part of the United States.

**Hack'ensack**, N. J., the county-seat of Bergen co., 8 mi. s. e. of Paterson, on the Hackensack River and on the New Jersey & New York and other railroads. The village has silk mills and manufactories of jewelry, wall paper and other articles, but it is preëminently a residence place. The town was first settled by the Dutch about 1640, near a village of the Hackensack Indians. During the Revolution Washington stopped here in his flight across New Jersey, and the town was later occupied by British and Hessians. Population in 1910, 14,050.

**Hack'ett**, JAMES KETELTAS (1869- ), an American actor, born at Wolf Island, Ontario. He was the son of James H. Hackett, a well-known American actor, and graduated at the College of the City of New York. He made his début in 1892 at the New York Lyceum, at the age of twenty-three, being at the time the youngest leading man in the history of the New York stage. His most notable successes have been in *The Prisoner of Zenda* and its sequel, *Rupert of Hentzau*, and *The Pride of Jennico*. He also appeared in *The Crisis*, a dramatization of Winston Churchill's novel. In 1897 he married the actress Mary Mannering and subsequently appeared with her in various successful plays, notably *The Walls of Jericho*.

**Hackles**. See HECKLES.

**Haddock**, a well-known fish of the cod family. It is smaller than the cod, which it much resembles, and it has a dark line along its side and a dark spot just behind the head. This fish commonly weighs from two to six pounds, though sometimes it weighs as high as ten pounds. It breeds in immense numbers in the northern seas in February and March and constitutes a considerable article of food. It is plentiful on the coasts of America, from New York to the Arctic regions. While not as valuable as the cod, the haddock is an important

## Hadrian

food fish. When dry-salted it is placed on the market as *finnan haddie*.

**Hades**, *ha'deez*, originally, the Greek name of the ruler of the lower world, afterwards known as Pluto. The name Hades was in later times applied to the region itself, which was supposed to be the abode of all departed souls, whether good or bad. The term is also used in the Greek scriptures to designate the home of the dead.

**Had'ith**, the Arabic name for a fable or tradition, specifically applied to the stories of Mohammed, which, with the Koran, form the final authority in questions of Mohammedan theology.

**Hadj** or **Hajj**, *haj*, the Mohammedan pilgrimage to the Kaaba at Mecca, which every Mohammedan is bound to perform once in his life, if his health and means permit, after which he is entitled to prefix *Hadji* to his name. The pilgrimage was made in disguise by Burckhardt in 1814, by Burton in 1853 and by T. F. Keane in 1878, each of whom published accounts of the journey.

**Hadley**, ARTHUR TWINING (1856- ), an American educator, born at New Haven, son of James Hadley. He was educated at Yale and at the University of Berlin. After completing his studies abroad, he became tutor at Yale and later professor of political science. In 1899 he was elected president of the university. Doctor Hadley attained more than a national reputation by his writings on financial and economic subjects, on both of which he is considered eminent authority. He has been president of the American Economic Association and is the author of *Railroad Transportation, its History and Laws*; *Report on the Labor Question*; *Economics*; *An Account of the Relations between Private Property and Public Welfare*, and *The Education of the American Citizen*, besides a large number of articles which have appeared in the leading periodicals.

**Ha'drian**, (76-138) fourteenth Roman emperor. His father, who was a cousin to the emperor Trajan, died when he was ten years old and left him under the charge of his illustrious kinsman. He married Sabina, Trajan's grand niece, accompanied the emperor on his expeditions, filled the highest offices and, on the death of Trajan, assumed the government as his adopted son (117). He made peace with the Parthians, renouncing all conquests east of the Euphrates, and bought off a war with the Roxolani by the payment of a sum of money. From the year 121 he spent most of



## Hadrian's Tomb

his time visiting the various provinces of the Empire. He traveled into Asia and Africa and lived in Athens for three years. In 131 he promulgated a fixed code of laws, which formed an important epoch in the development of Roman law. In 132 the Jews revolted, and for four years they carried on a bloody war, the only notable one of his reign.

**Hadrian's Tomb**, an enormous round tower, erected by Hadrian in Rome about 130 A. D. and completed by Hadrian's successor. In the Middle Ages it was used as a fortress and prison, and material changes have been made from time to time. Tradition says that Beatrice Cenci, Cagliostro and Buenvenuto Cellini were confined in it. At present it is called the Castello Saint Angelo, and though it is still imposing, it has lost much of its grandeur.

**Hadrian's Villa**, a large group of beautiful buildings erected near Tivoli, sixteen miles from Rome, by the emperor Hadrian and intended to illustrate the various scenes and buildings which he visited. The villa was ten miles in circumference and contained gardens, theaters, baths, colonnades, terraces, libraries, temples and a stadium. It was adorned with beautiful statues and works of art, in close imitation of Greek models. The ruins have furnished important works of art, now found in the various museums of Rome.

**Haeckel**, *hek'l*, ERNST (1834– ), a German naturalist, born at Potsdam. He studied medicine and science at Berlin, Wurzburg and Vienna. After traveling in Norway and Italy, he became professor of zoölogy at Jena in 1865. He became the most prominent exponent of the Darwinian theories in Germany. Among his works are *The History of Creation*, *Anthropology*, *History of the Evolution of Man*, *Collected Popular Discourses on the Development Theory* and *Origin and Development of Animal Tissues*.

**Haemoglobin**, *hem o glo'bin* or *he mo glo'bin* (haemoglobulin), a substance found in the red corpuscles of the blood, which has the property of absorbing oxygen from the air and of giving it up to the tissues of the body. It gives color to the blood. The hematin in haemoglobulin contains iron. See BLOOD.

**Hafiz**, *hak'fiz* (?—about 1389), a celebrated Persian writer, one of the most famous lyric poets of all time. His verses have remarkable delicacy and melody and are chiefly upon themes of springtime, love and pleasure.

**Hagenbeck**, *hak'gen bek*, KARL (1844–1913), a German animal trainer, born at Hamburg,

## Haggard

where his father was a trader in animals. He inherited this business and greatly extended it. He traveled throughout Europe and in 1886 first visited the United States. At the World's Columbian Exposition in 1893 he exhibited more than one thousand animals, including rare wild species, and made several later tours through both America and Europe.

**Ha'gerstown**, MD., the county-seat of Washington co., 87 mi. n. w. of Baltimore, on the Baltimore & Ohio, the Norfolk & Western and other railroads. The city has good shipping facilities and is an important commercial center for the western part of the state. The industries include machine shops, knitting mills and the manufacture of pipe organs, furniture, agricultural implements and other articles. The place was settled about 1740 and was an important base of operations during the Civil War. Population in 1910, 16,507.

**Hagfish**, the name of the eel-like fishes, allied to the lampreys, that live as parasites upon fishes. They are of worm-like form and have no eyes or scales. The mouth is formed for suction, is without lips and is furnished with barbels. There is a single median fang upon the palate, by means of which the hag makes its way into the interior of other fishes, such as the cod, halibut and flounder. The skeleton is composed entirely of cartilage. The body is covered with a leathery skin that secretes a sticky fluid. An American species is common in rivers of New York and New England.

**Haggai**, *hak'ga i*, the tenth, in order, of the minor prophets, and the first of those who prophesied after the captivity. The book of Haggai consists of four distinct prophetic addresses, two in the first and two in the second chapter, intended to arouse his disheartened countrymen to the rebuilding of the Temple. They were delivered in 520 B. C. and are written in a brief and meager style. The closing prediction foreshadows the establishment of Christ's kingdom upon the overthrow of the thrones of the nations.

**Hag'gard**, HENRY RIDER (1856– ), an English novelist, born at Norfolk and educated at Ipswich Grammar School. He traveled widely and was admitted to the bar, but finally devoted himself almost exclusively to literary pursuits. His most popular novels are *King Solomon's Mines* and *She*, while among the others may be mentioned *Jess*, *Allan Quartermain*, *Montezuma's Daughter* and *The Return*

## Hague

of *She*. His works are of no artistic value, but hold the attention by their weird scenes and incidents.

**Hague, hayg, The**, the capital of the Netherlands, is situated in the province of South Holland, 33 mi. s. w. of Amsterdam and within 3 mi. of the North Sea. The city is beautifully laid out and is characterized by broad, regular streets, which are frequently intersected by canals and bordered with rows of trees. The finest buildings are in the northern section of the city. Among them are the government buildings, the town hall, the Groote Kerk, or Saint James Church, the palace of justice and the Binnenhof. Among the celebrated institutions of the city, the royal art gallery, containing a rich collection of Dutch art, including a number of masterpieces by Rembrandt, ranks first. The royal library contains 500,000 volumes and a large collection of coins and medals, and the municipal museum contains a large collection of paintings. The leading educational institutions include a gymnasium, the royal school of music, a drawing school and an educational institute conducted by the Free Masons. The Hague is also the home of many learned societies.

The prosperity of the city depends almost entirely upon its being the capital of the country. Its industries and trade are comparatively small, the leading manufactures including the manufacture of iron, ordnance, gold and silver ware, hats and furniture. The city was originally the hunting center of the counts of Holland. In 1250 it became a princely residence and in the sixteenth century was the seat of the States-General. From this it became the capital of Holland. The Hague has held an important position among European capitals, since it has been a sort of diplomatic center, and many important treaties have been negotiated there, including the Triple Alliance of England, France and Holland, and in 1899 it was the seat of the International Peace Conference, which established there a permanent court of arbitration (See PEACE CONFERENCE, INTERNATIONAL). Population in 1911, 288,577.

**Hague Peace Conference.** See PEACE CONFERENCE, INTERNATIONAL.

**Hahn'emann, SAMUEL CHRISTIAN** (1755-1843), the founder of the homeopathic system of medicine, born at Meissen, Germany. He studied medicine at Leipzig, Vienna and Erlangen and took his degree at the last mentioned place in 1779. After practicing in various places,

## Hair

he published in 1810 his great work, which fully explained his new system of curing any disorder by employing a medicine which produces a similar disorder. Hahnemann was driven from Saxony when the government prohibited him from dispensing medicines, but he found an asylum ultimately in Paris, where his system was authorized by the government and acquired popularity, which has steadily increased. Among his works notice is due to his *Dictionary of Materia Medica*, his essays on *Poisoning by Arsenic* and *Effects of Coffee* and his treatise on *Chronic Affections*. See HOMEOPATHY.

**Haidarabad, hi dur 'a bahd'**. See HYDERABAD.

**Hail**, small masses of ice or frozen rain falling from the clouds in showers or storms. Hailstones vary in their form, being either angular, pyramidal or star-shaped. Sometimes they are as hard as ice and sometimes as soft as snow. At the center there is generally an opaque spongy mass, resembling sleet in its composition, and round this a semi-transparent frozen mass, consisting of a succession of layers of ice, is formed. Properly there are two kinds of hail, the small grains, which generally fall in winter and usually before snow, and the large hail, which occurs chiefly in spring and summer and is most severe in very hot climates. The small-grained hail is probably formed by the freezing of raindrops as they pass in falling through colder air than that from which they started. The large hail is probably due to the meeting of two currents of air, of very unequal temperature and electric tension. Hailstones are usually about one-fourth of an inch in diameter, but they are occasionally of much larger dimensions, being sometimes even three or four inches in diameter. In hot climates hailstones are very destructive to crops.

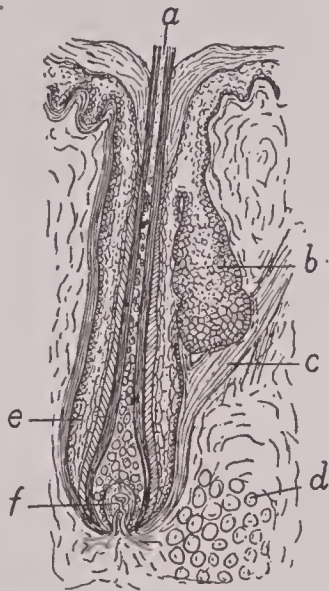
**Hainan, hi nahn'**, an island of China, belonging to the Province of Kwang-tung, between the China Sea and the Gulf of Tonquin, separated from the mainland by a channel of fifteen miles, encumbered with shoals and coral reefs. The lowlands are fertile and produce timber, rice, sugar and cotton. The fisheries are also productive. The interior, which is mountainous and covered with forests, is inhabited by a distinct race, still in a very primitive stage. There are also many Chinese. The capital is Kiungchow, a large seaport on the northern coast. Population, estimated at 2,500,000.

**Hair**, the fine, thread-like, more or less elastic substance, of various form and color,



which forms the covering of the skin in mammals. It has the same use as feathers in birds and as scales in fishes and reptiles, and it varies from the finest wool to the quills of the porcupine and the bristles of the hog. The human body is naturally covered with long hair only on a few parts, yet nearly all parts produce a fine, short, colorless, sometimes hardly perceptible hair. The only places entirely free from it are the palms of the hands and the soles of the feet.

Each hair consists of a shaft—the part outside the skin, which does not grow—and a root, imbedded in the skin, which expands at its lower end into a swelling, or bulb, composed of little cells. It grows by forming new cells, which press the old ones forward to become part of the shaft. Each hair is said to live from two to four years. If the root is destroyed there is no means of reproducing the hair; but if the hair falls out, as is often the case after nervous fevers, it will grow again. The



SECTION THROUGH THE ROOT OF A HAIR

a, Shaft of the hair; b, sebaceous gland; c, muscle that raises the hair; d, fatty tissue; e, root sheath; f, vessels that nourish the hair.

color of the hair is due to pigment in the cells. Gray hair is caused by a deficiency of pigment. Baldness is caused by death of the papilla, or hair bulb, generally due to lessened circulation of the blood in the scalp. Connected with the bases of the hairs are small glands, called *sebaceous glands*, which secrete an oily substance that serves to keep the skin, as well as the hair, soft.

Hair, chiefly from the horse, the ox, the hog, the goat, especially the Angora or Mohair goat, the camel and the alpaca, is used for manufacturing purposes. That of the first three is used mostly for upholstery, the short hair being manufactured into curled hair for stuffing, and the long, straight hair being made into hair-cloth for seating. The long hair is also used for making fishing lines and brushes. White hair, because it can be easily colored, is used in the manufacture of fancy articles. The horse hair for weaving comes from Russia, Germany, Belgium, South America and Australia. Russia

also furnishes the bristles so largely used for brushes. The finer brushes, or hair pencils, of painters are made from the hair of the sable and the marten. The hair of the goat, the camel and the alpaca is chiefly used in combination with wool and other fibers for spinning and weaving into dress fabrics. Wigs, curls and beards are made from human hair, which comes largely from France, Germany and Italy, where the peasant girls sell their hair to dealers. In every case and for any purpose hair taken from the living subject is best.

**Hair Dressing.** From the earliest times the care of the hair has been an important part of the toilet. The ancient Assyrians, Babylonians, Persians and Egyptians curled the hair and beard with the utmost care and even wore wigs and false beards. The Hebrews gave much attention to the hair and considered a bald head a disgrace. The Greeks considered abundant hair one of the greatest marks of beauty, and Homer counts it among the gifts of Aphrodite. The various styles of hair dressing which obtained among the Greeks in very ancient times are shown in statues, and some of them were very elaborate, both for men and for women, but by the fifth century B. C. the men began to wear their hair more simply, either cut very short or left in its natural curls, while the women developed more elaborate styles. The custom of wearing false hair was brought from Asia to Greece and was for a time very popular. Until about 300 B. C. the Romans wore their hair long. Even at the time of Cicero this custom still prevailed to a certain extent, although the warriors and artisans of the period wore their hair short. In early times the Roman women wore their hair either flowing over the shoulders or gathered into a simple knot, but from the time of Augustus Caesar the fashions became more and more elaborate.

During the greater part of the Middle Ages the hair was worn very simply, but by the fourteenth century most elaborate coiffures began to appear. The men during the fifteenth and sixteenth centuries wore their hair rolled back from the forehead in a fashion similar to the later pompadour style for women, and their beards were tightly curled and gummed so as to stand out like a fan. For women, about this time, a fashion was prevalent of wearing a broad cushion, or coronet, resting on a great mass of curled or crimped hair. Louis XIV of France had very long and abundant hair, and the desire of his courtiers to imitate him brought

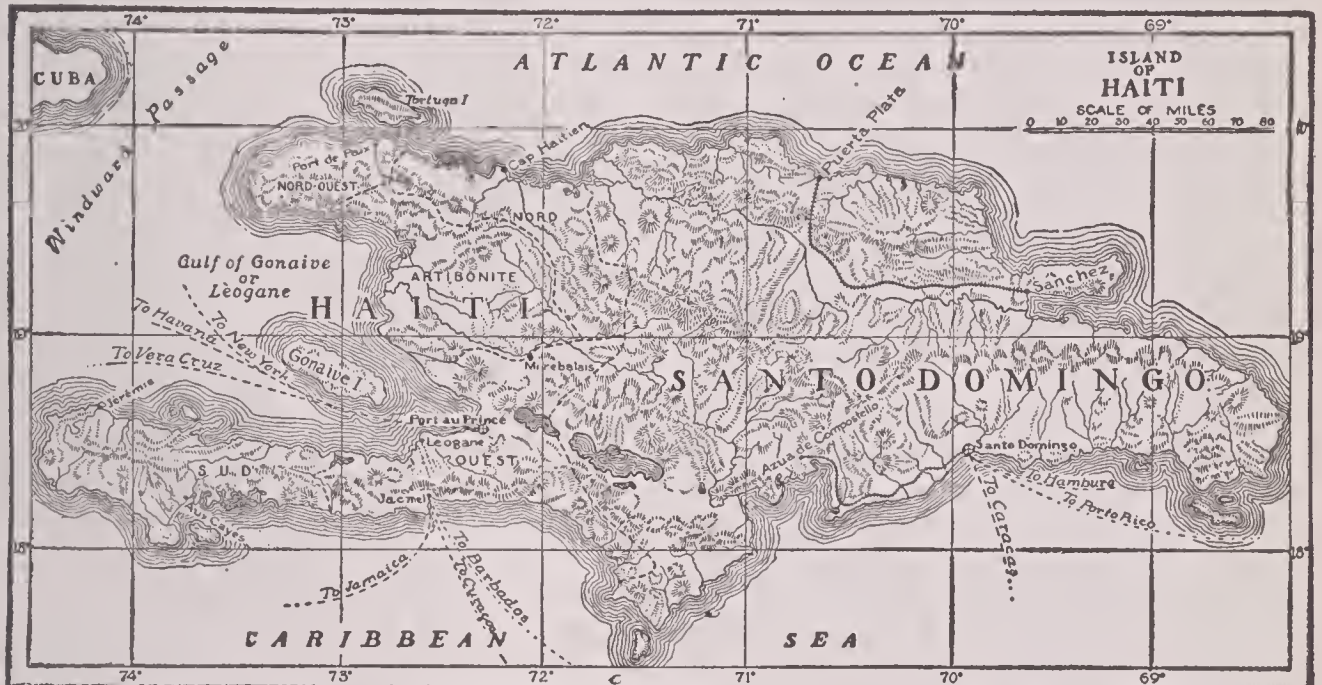


## Hair Worm

about the introduction of long curled wigs. The custom of wearing wigs was general for about a century after 1650, and no attention therefore was paid to hair dressing for men. From about 1640 to 1670 women wore their hair curled and falling over the shoulders and covered with a veil of gauze. Toward the close of the seventeenth century, however, more elaborate fashions returned, and tall headdresses of lace and starched cambric were used. Under Louis XVI of France, hair dressing reached a point of elaboration which has been approached at no other period. The women built their hair into a sort of tower, which they stiffened with wire or haircloth and upon which they wore a little cap or hat. There is a record of one style in which this hat was replaced by a

## Haiti

**Haiti** or **Hayti**, *ha'te*, one of the West Indies, after Cuba the largest of these islands. It lies southeast of Cuba and is separated from it by the Windward Passage, which is 50 miles broad. The island is 400 miles long and from 60 to 150 miles broad, and it is composed of the two republics, Haiti in the west and Santo Domingo in the east. The total area is about 28,250 square miles, about that of the State of Maine. Most of the island is very mountainous, the Cibao being the principal range, and Loma Tina, 13,300 feet high, the highest point. Among the rivers which have their source in the Ciboa range are the Artibonite, the Yaqui del Norte, the Juna and the San Juan. The soil is very fertile, and a great part of the island has dense forests of mahogany, cedar and logwood. Silver, tin,



model of a ship of war.

By the beginning of the nineteenth century, elaborate hair dressing for men had entirely gone out of fashion, and in most countries the hair was worn short. In the early part of the century women dressed the hair very simply, letting it fall at the sides in a series of ringlets and catching it at the back of the head with a ribbon. This was gradually superseded by an arrangement of the hair at the top of the head. During this period the hair was often arranged over a large roll, in a style known as the *chignon*, or waterfall. The tendency during the last half century among civilized people has been toward simplicity in hair dressing.

**Hair Worm**, the common name for a number of slender worms. See *TRICHINA*.

platinum and iron are found to some extent in the island.

Haiti was discovered by Columbus in 1492, and the first permanent colony established by the Europeans in the western hemisphere was planted on the coast, the town of Santo Domingo being founded in 1496. For a long time the island belonged to Spain, but in 1600 the French began to settle here, and in 1697, by the Treaty of Ryswick, the western part was ceded to France. Most of the inhabitants were slaves, and in 1791 a fierce insurrection of the negroes broke out. They were led by Toussaint L'Ouverture, who established an independent republic and ultimately ruled as dictator over the whole island. In 1802 Bonaparte waged war against him, and he was seized and taken to France. The



## Hajj

next year the negroes rose and drove out the French. After the brief rule of Dessalines the Spaniards regained the eastern portion of the island. Most of the history of both the Republics has been marked by revolutions and insurrections. Among the principal towns in Haiti are Port-au-Prince, Santo Domingo, Cape Haytien and Jacmel. Population of the Republic of Haiti in 1909, 2,029,700; that of the Republic of Santo Domingo, estimated at 675,000. See SANTO DOMINGO.

**Hajj.** See HADJ.

**Hakluyt**, *hak'loot*, RICHARD (about 1552-1616), an English geographer and historian. He graduated at Oxford and remained at the institution as lecturer upon his chosen subjects. In 1582 he published *Divers Voyages Touching the Discovery of America*, and within the next few years he wrote supplementary works upon the same subject, the most famous being *The Principal Navigations, Voyages and Discoveries of the English Nation*. This work had great vogue and was consulted by all the mariners of the time. He was influential in furthering the colonization of America and was a stockholder in the London Company, which settled Virginia.

**Hakodadi**, *hak'ko dah'de*, or **Hakodate**, *hak'ko dah'ta*, a city of Japan, near the south end of the island of Yezo. It lies at the foot of a hill on the shore of a beautiful and spacious bay, which forms one of the best harbors in the world. Hakodadi is one of the ports opened to American commerce as a result of Commodore Perry's treaty with the Japanese government in 1854. Population in 1908, 87,875.

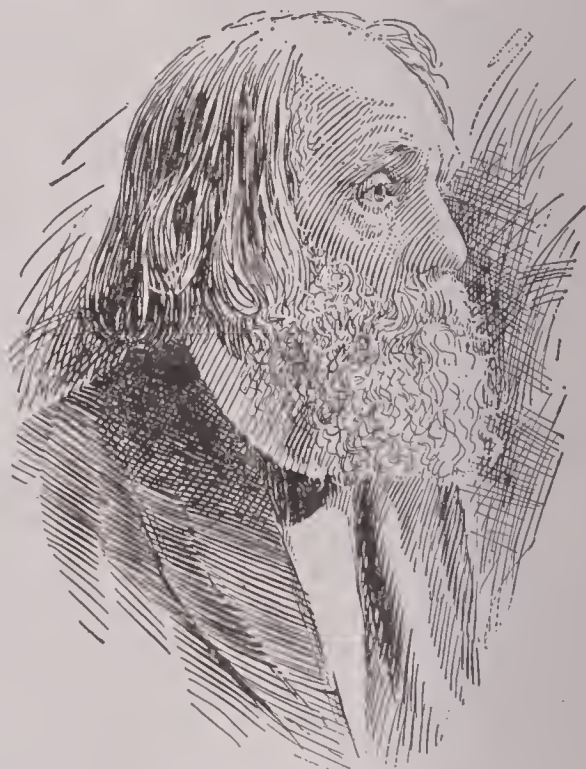
**Halberd**, *hol'burd*, or **Halbert**, an offensive weapon, consisting of a pole or shaft about 6 feet long, with a head armed with a steel point edged on both sides. Near the head was a cross piece of steel, somewhat in the form of an axe, with a spike or hook at the back. It was much used in the English army in the sixteenth century and gave its name to troops called *halberdiers*, to whom was confided the defense of the colors and other special duties. It is now used only on ceremonial occasions.

**Halcyon**, *hal'se on*, an old or poetical name of the kingfisher. It was said in fable to lay its eggs in nests that floated on the sea and to have the power of charming the winds and waves during the period of incubation, so that the weather was then calm. From this superstition comes our term *halcyon days*.

**Hale**, EDWARD EVERETT (1823-1909), a Unitarian clergyman, philanthropist and author.

## Hale

son of Nathan Hale, a journalist, was born at Boston, Mass. His early education was received at the Boston Latin School. He graduated from Harvard University in 1839 and settled as pastor of a Unitarian church at Worcester, Mass., in 1846. Ten years later he returned to Boston and took charge of the South Unitarian church and remained its active pastor forty-five years. Mr. Hale's interest in all reforms and progressive movements had a great and beneficial influence. He founded and for a long time edited the *Christian Examiner*, a Unitarian weekly, and



EDWARD EVERETT HALE

*The Old and the New*, which in 1875 was merged with *Scribner's Monthly*. He became widely known as a brilliant lecturer and able writer, and has been called "The American Defoe," because he gives his romances such a striking appearance of reality. This is well illustrated in *The Man without a Country*, which was widely read during the Civil War. Of his later writings the most important are *Philip Nolan's Friends*, *The Story of Massachusetts*, *A New England Boyhood*, *Lowell and His Friends*, *Memoirs of a Hundred Years* and *Ten Times One is Ten*. The last led to the founding of such charitable clubs as King's Daughters, Lend-a-Hand and others. He also wrote and edited many important historical works. He was chosen chaplain of the United States Senate in 1903.

**Hale**, EUGENE (1836- ), an American politician, born in Oxford County, Maine. He

## Hale

received only an elementary education, was admitted to the bar in 1857 and became county attorney of Hancock County; later he was member of the legislature, and from 1869 to 1879 he was a member of Congress as a Republican. He was offered cabinet portfolios by Grant and Hayes, but declined, and was elected in 1881 to the United States Senate, where he served continuously for thirty years.

**Hale, JOHN PARKER** (1806–1873), an American statesman, born in Rochester, N. H. He was educated at Phillips Exeter and at Bowdoin College and was admitted to the bar in 1830. As a strong Jacksonian Democrat he was elected to the state legislature and from 1834 to 1841 was United States district attorney. Elected to Congress in 1842, he became prominent in his opposition to slavery, contrary to the wishes of his constituents. In 1845 he undertook a great antislavery campaign in his state and achieved remarkable success, being chosen United States senator in 1846. He opposed the Mexican War and refused to vote for a resolution of thanks to generals Scott and Taylor. In 1852 he was nominated for the presidency by the Free-Soil party and polled 157,685 votes. He retired from the Senate in 1853, but was reelected in 1855, serving until 1865, as a vigorous supporter of President Lincoln.

**Hale, MATTHEW, Sir** (1609–1676), an English jurist, born at Alderley, Gloucestershire. He graduated at Oxford and began the study of law, devoting time, besides, to investigations in history, mathematics, science, theology and philosophy. He was admitted to the bar in 1637 and soon gained a large practice. He remained neutral in the struggle between Parliament and the king until Parliament had gained supremacy, and then he held positions of honor under the Commonwealth and the Protectorate. He was instrumental in securing the restoration of Charles II and was knighted by him and made chief baron of the exchequer. Somewhat later he became chief justice. Hale's writings upon English law have always been consulted as the very highest authority and have been the basis of many later treatises, notably Blackstone's *Commentaries*.

**Hale, NATHAN** (1755–1776), an American soldier and hero, born at Coventry, Conn. In 1773 he graduated at Yale, and he taught school in East Haddam and New London, Conn., until the outbreak of the Revolutionary War. He enlisted as a volunteer, became a lieutenant in Colonel Webb's regiment and was assigned recruiting duty in New York. On Washington's

## Halftone

call for a volunteer to enter the British lines and procure intelligence, he responded. Disguised as a Dutch schoolmaster, he visited all the enemy's camps in New York and Long Island, made drawings of the works and obtained all the information required. He was about to return when he was arrested as a spy, tried and condemned to be hanged. The execution took place in New York City. His last words were, "I only regret that I have but one life to lose for my country." Statues have been erected to him in Hartford, Conn., and in City Hall Park, New York.

**Halevy, ah la ve', JACQUES FRANÇOIS FRO-MENTAL** (1799–1862), a French musical composer, born of Jewish parentage at Paris. His masterpiece, *La Juive*, appeared in 1835 and rapidly obtained wide fame in Europe. Among his other works are *L'Eclair*, *Guido et Ginevra*, *La Reine de Chypre* and *La Fée aux Roses*, all of which disclose deep feeling.

**Halevy, LUDOVIC** (1834–1908), a French novelist and dramatist, born in Paris. He first achieved fame as the author of the librettos for Offenbach's light operas, including *La Belle Hélène* and *La Barbe Bleue*. He soon began the construction of farces and in 1869 he produced his first serious drama, *Frou-Frou*, one of the most important dramas of the century. Of his novels, the most widely known are probably *L'Abbe Constantin*, *Criquette* and three remarkably interesting stories dealing with the Cardinal family. He was elected to the French Academy in 1884, was previously made chevalier of the Legion of Honor and became commander in 1900.

**Half'tone**, a process of making, from photographs and engravings, plates which resemble electrotypes. The process of making halftones is somewhat complicated. Engravings, photographs and drawings can be reproduced by this method, but photographs give the best results, and for this reason are the most generally used. The first step in the process consists in making a negative of the picture, in a camera containing a screen specially prepared for the process. This screen consists of two glass plates, ruled with parallel lines, which are very near together. The lines cross the plates diagonally and are so drawn that when the two plates are placed together they form diamond-shaped checks. These plates are cemented together with Canada balsam and placed in the camera near the plate upon which the negative is made. It is by means of these screens that the dots which give the shadow



## Haliburton

effect in the halftone are produced. The dots covering the portion of the picture which has the high lights are lighter and larger than those covering the portions in shadow, so that the lights and shadows in the picture are exactly reproduced in the negative.

After the negative has been developed, it is carefully removed from the plate and laid face downward upon the sensitized copper plate upon which the halftone is to be made. The copper plate is prepared by planing and polishing; it is then covered with a thin film of sensitized material, upon which the photograph is made. This material hardens under the action of light; and if the plate and the negative be exposed to an electric light for a few moments and the sensitized plate be "developed" in certain chemicals, a reproduction of the picture is left upon the copper. By washing, those portions of the sensitive film which were not acted upon by the light are dissolved away, leaving the others to protect the surface of the copper. The plate is then placed in an acid bath and etched (See ETCHING), after which it is cleaned and is then ready for printing.

The fineness of the halftone depends upon the number of lines on the screen. For halftones of the best grade from 150 to 200 lines to the inch are used. Poorer grades contain coarser screens, and in these the checks are plainly seen. Halftone plates are comparatively cheap and produce good pictures. For these reasons they are very generally used in the illustration of books and periodicals. See PHOTOGRAPHY.

**Hal'iburton**, THOMAS CHANDLER (1796-1865), a British-American humorist, whose pen name was Sam Slick. He was born at Windsor, Nova Scotia, and was educated in Canada, where he became a judge of the supreme court. In 1856 he removed to England, and three years later he became a member of Parliament. His fame rests on his *Sam Slick*, in which he pictures a Yankee clockmaker, whose shrewd sayings and knowledge of human nature won immediate popularity. A later series, in which Sam Slick appears as an attaché of the United States legation in England, gave Haliburton the opportunity for much humorous comment on British customs. His other works include *Wise Saws and Modern Instances*, *Nature and Human Nature*, *Bubbles of Canada* and *An Historical and Statistical Account of Nova Scotia*.

**Hal'ibut**, one of the largest of the flatfish family, sometimes weighing more than 300 pounds. The fish has a compressed body, one

## Hall

side resembling the back and another the belly, and both eyes are on the same side of the head. The halibut is caught on both sides of the Atlantic and is much prized as food. See FLOUNDER.

**Hal'ifax**, a manufacturing town of England, in the County of York, West Riding, 14 mi. e. s. e. of Leeds, on the Calder River. The principal buildings are the Piece Hall, the parish church, All Souls' Church, a fine townhall and several museums and hospitals. There are also several parks, libraries, picture galleries, a Blue Coat School and an Observatory. The chief manufacture of Halifax is woolen goods, and the city also produces carpets and other textile goods. Population in 1911, 101,553.

**Halifax**, a city, the capital of Nova Scotia, situated on the slope of a commanding hill, on the western side of Halifax harbor. Among the buildings are the Dominion Building, the Government House, the Roman Catholic Cathedral, Saint Paul's Church and Dalhousie College. The harbor is one of the best in the world. It is the principal naval station of British America. has an extensive foreign and coasting trade and exports large quantities of fish, lumber and coal. The city contains a large royal dockyard, 610 feet in length. There are considerable manufactures, embracing iron castings, machinery, nails, soap, leather, tobacco and paper. Halifax has extensive steamship communication with Canada, United States, Great Britain and the West Indies.

In 1917 in the harbor of Halifax a Belgian relief ship and a munitions ship collided, causing a fire and explosion on the latter. The three thousand tons of explosives destroyed caused disaster in the city exceeding that of a great earthquake. A quarter of the town was destroyed, 1200 people were killed and 4000 injured. Many of the dead were buried beneath falling walls. Population, 1911, 46,619.

**Halifax**, CHARLES MONTAGUE, Earl of (1661-1715), an English statesman and poet. It was at his suggestion that the national debt was established as a means for raising funds, and the Bank of England was founded through his instrumentality. Halifax was twice impeached, but the impeachment was never carried through. His poem on the death of Charles II and a parody on Dryden's *Hind and Panther*, called *The Town and Country Mouse*, attracted considerable notice in their time.

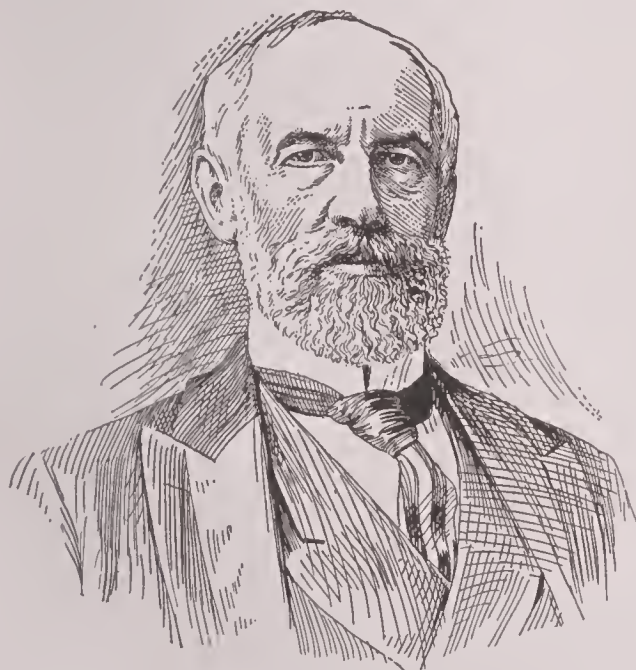
**Hall**, in architecture, a large room or apartment; in modern usage, the room into which others open or which connects two or more

## Hall

apartments. Halls in the original sense formed the subject of closest study by architects of medieval times, and many of them, occupying whole buildings, were of the greatest beauty. In the later Middle Ages so-called guildhalls were constructed and served as market places in commercial centers. Many of them are still standing, among which the most interesting are the Butchers' Hall at Ghent, the Bakers' Hall at Brussels, the Cloth Hall at Ghent and the Bankers' Hall at Antwerp.

**Hall**, ASAPH (1829-1907), an American astronomer, born in Goshen, Conn., and educated in Central College, New York, and at the University of Michigan. In 1862 he became an assistant in the naval observatory at Washington, and in the following year was made professor of mathematics in the same institution; but in 1891 he left the government service with the rank of captain. Hall was sent with various scientific expeditions undertaken by the government, amongst which were those to Bering Strait in 1869, to Colorado in 1878 and to Vladivostok, Siberia, in 1874, to observe the transit of Venus. The greatest of his numerous discoveries was that of the moons of Mars, and his most important work was a study of the double stars. For six years he was professor of astronomy at Harvard.

**Hall**, GRANVILLE STANLEY (1845- ), an American educator and psychologist, educated at



G. STANLEY HALL

Williams College and in Germany. He held successively the positions of professor of psychology in Antioch College, lecturer on psy-

## Halle

chology at Harvard and Williams, professor of psychology in Johns Hopkins University and president of Clark University, Worcester, Mass. Doctor Hall is recognized throughout the country as an eminent authority upon education and has been one of the leaders in adapting methods of instruction to the new psychology. He is also an authority on, and one of the leaders in, the movement of child study in this country. He is the author of *Methods of Teaching History*, *How to Teach Reading*, *Contents of Children's Minds* and *Adolescence*, an elaborate work touching on the relation of adolescence to education. He is also a frequent contributor to educational periodicals.

**Hal'lam**, HENRY (1777-1859), an English historian. He was educated at Eton and Oxford and studied for the law, but abandoned it for literary pursuits. His contributions to the *Edinburgh Review* brought him into notice, and his *View of the State of Europe during the Middle Ages*, which appeared in 1818, at once established his reputation. His next work, the *Constitutional History of England from the Accession of Henry VII to the Death of George II*, showed, like the first, the solid learning, patient research, accuracy and impartiality of statement which are characteristic of Mr. Hallam's work. In 1837-1839 appeared his last great work, the *Introduction to the Literature of Europe in the Fifteenth, Sixteenth and Seventeenth Centuries*, a useful survey of literary history, though wanting in the fineness of judgment necessary for such work. His youngest son, Arthur Henry, a youth of high promise, who died suddenly at the age of twenty-two, is the subject of Tennyson's *In Memoriam*.

**Halle**, hahl'le, usually called *Halle an der Saale* (Halle on the Saale), to distinguish it from other places of the same name, an important German town in the Prussian province of Saxony, about 20 mi. n. w. of Leipzig, on the river Saale. The university, with which that of Wittenberg was incorporated in 1817, is a celebrated institution, founded in 1694 and attended by 2000 students. Halle has an extensive trade, and manufactures chemicals, oil, malt, dyes, agricultural machines and salt, which it mines on an island in the Saale. Population in 1910, 180,551.

**Halle**, UNIVERSITY OF, a German university, founded by the Lutheran Church in 1694. It was established as the educational center of the Lutherans in Germany, and from the start it had a large number of students. It was begun as a theological school and has ever since been



one of the leading institutions of this class in Germany. In 1817 the University of Wittenberg was united with it. The school is very prosperous, maintains the usual departments of literature, theology and science and gives special attention to instruction in agriculture. The number of students is usually about 2000, and the library contains over 210,000 volumes.

**Hal'leck**, FITZ-GREENE (1790-1867), an American poet. He became a clerk in a New York banking house and for years was in the employment of John Jacob Astor. In 1819, poems by him and his friend Drake appeared in the New York *Evening Post*, under the signature of Croaker & Co., and attracted some attention. It was on the death of Drake that Halleck wrote his most beautiful poem, beginning "Green be the turf above thee." In 1820 he published *Fanny*, his longest poem, a satire on the follies and fashions of the day. Among his best poems are *Marco Bozzaris*, *To the Memory of Burns*, *Alnwick Castle* and *Red Jacket*.

**Halleck**, HENRY WAGER (1815-1872), an American general, born in Westerville, N. Y., and educated at West Point. In 1846 he published *Elements of Military Art and Science*, and he was raised to the rank of captain for his services in the Mexican War. In 1854 he left the army and settled in San Francisco as a lawyer and director of a mining company. On the outbreak of the Civil War, in 1861, he was created major general in the United States army, and after the victories at Paducah and Fort Henry and Fort Donelson and the capture of Corinth, he became, in 1862, commander in chief, a position which he held till superseded by General Grant in 1864. Ultimately he received the command of the South Division, at Louisville.

**Hallelujah**, **Alleluia** or **Halleluia**, *hal'le-loo'yah* (praise ye the Lord), a Hebrew formula of praise, often occurring in the *Psalms*. It is retained in the translations of the various Christian churches, probably on account of its full and fine sound, so proper for public religious services. The *Great Halleluja* is the name given by the Jews to *Psalms* 113-117, which are sung on the feasts of the Passover and Tabernacles. The great "Hallelujah Chorus" in Handel's oratorio *Messiah* is considered one of the most magnificent pieces of choral music ever written.

**Haller**, *hahl'lur*, ALBRECHT VON (1708-1777), a famous Swiss scientist and poet. He was a practicing physician and professor of anatomy, a botanist of great fame and one of the leaders in the modern school of German poetry.

Many years of his life were spent entirely in original investigation, and the result of his work has been published in numerous volumes. At one time he resided in England as the physician to the king, an appointment he received in 1739.

**Hal'ley**, EDMUND (1656-1742), an English astronomer and mathematician, born in London and educated at Saint Paul's School and at Queen's College, Oxford. He traveled extensively and made observations on important celestial phenomena, making a catalogue of the stars of the southern hemisphere. Newton's calculations of a comet's orbit were based partly on Halley's observations. Halley had charge of a voyage in the Pacific for the observation of the stars and was so successful that he was made a captain in the navy with half pay for life. In 1703 he became a professor of geometry at Oxford and ten years later became secretary of the Royal Society, which position he held until his death, devoting most of his time and study to the observation of the motions of the moon. A great many important discoveries are accredited to Halley, who is remembered as the first one to predict the return of a comet.

**Hall of Fame**, a building on the grounds of the New York University, erected as a memorial to famous Americans and completed in 1900. It consists of a colonnade 400 feet long, with provisions for 150 panels, two feet by six, each to bear the name of a famous American. Only persons who have been dead ten years or more and were born in territory of the United States were originally eligible. Fifty names were to be inscribed at the beginning, and five additional names were to be added every fifth year until the year 2000, when the 150 inscriptions will be completed. The nominations of the public were invited, and these, on being seconded by the senate of the University, were submitted to a board of one hundred judges, eminent citizens chosen by the council. The rule requires that no one who receives less than fifty-one votes can be accepted. In 1900, of the 252 names submitted, twenty-nine received the required number of votes; the following were chosen: George Washington, Abraham Lincoln, Daniel Webster, Benjamin Franklin, Ulysses S. Grant, John Marshall, Thomas Jefferson, Ralph W. Emerson, Henry W. Longfellow, Robert Fulton, Washington Irving, Jonathan Edwards, Samuel F. B. Morse, David G. Farragut, Henry Clay, Nathaniel Hawthorne, George Peabody, Robert E. Lee, Peter Cooper, Eli Whitney, John Audubon, Horace Mann. Henry Ward Beecher,

## Hallow-even

James Kent, Joseph Story, John Adams, William E. Channing, Gilbert Stuart, Asa Gray. In 1904 it was decided that a small hall for foreign-born Americans and a hall for women should be built. In 1905 the following were added: John Q. Adams, James R. Lowell, William T. Sherman, James Madison, John G. Whittier, Alexander Hamilton, Louis Agassiz, John Paul Jones, Mary Lyon, Emma Willard and Maria Mitchell. In 1910 these were added: Harriet Beecher Stowe, O. W. Holmes, Edgar Allan Poe, Roger Williams, James Fenimore Cooper, Phillips Brooks, William C. Bryant, Frances Willard, Andrew Jackson, George Bancroft, John L. Motley.

**Hal'low-e'ven** or **Hallowe'en'**, the evening of October 31, so called as being the eve or vigil of All Hallows, or All Saints, which falls on November 1. It is associated in the popular imagination with various superstitions and is frequently celebrated by young people with various tricks, games and rites.

**Hallucination**, *hal lu'se na'shun*, a condition of mind in which a person thinks he sees or hears things that have no existence. The mind acts without a sensation to produce the action. Hallucinations are to be distinguished from delusions, for in the latter there are real sensations, which are erroneously interpreted. All the senses are not equally subject to hallucinations. Hearing is most frequently affected, and then sight, smell, taste and touch, in order. Hallucinations of several senses may exist simultaneously in the same individual, and these may be complicated with certain delusions. The simplest form of hallucination of hearing is the ringing in the ears; but the striking of clocks, the sounds of musical instruments and of the human voice are often heard. Hallucinations are not confined to those whose mental faculties are disordered. Occasionally they appear in healthy persons, and the individual is fully conscious of the unreality of the objects that affect his senses. Sometimes after long periods of intense mental work, troublesome hallucinations may appear, but rest will drive them away.

**Halmahera**, *hahl'ma ha'rah*. See GILOLO.

**Ha'lo**, the name given to colored circles of light sometimes seen around the sun or moon, and to other similar luminous appearances. These phenomena are classified as (1) *halos proper*, consisting of complicated arrangements of arcs and circles of light surrounding the sun or moon, accompanied by others tangent to or intersecting them; (2) *coronas*, simple rings,

## Ham

generally somewhat colored; (3) *aureolas*, bright rings surrounding shadows projected upon a cloud or fog-bank, or the colored rings observed by aeronauts on the upper surface of clouds. All these appearances are the result of certain modifications which light undergoes by reflection, refraction, dispersion, diffraction and interference, when it falls upon the crystals of ice, the raindrops or the minute particles that constitute clouds.

**Halogen**, *hal'o jen*, (sea salt producer), a name given to a family of four elements, because they closely resemble the sea salt and the salts of sodium. All strongly resemble one another and form colorless hydrogen compounds which fume strongly in the air. The typical member is fluorine, which, however, has many characteristics not possessed by the other members of the family. See FLUORINE; CHLORINE; BROMINE; IODINE.

**Hals**, *hahls*, FRANS (about 1584–1666), a Dutch painter, probably second only to Rembrandt. He was born at Antwerp, but soon went to Haarlem and studied under eminent teachers. He is especially famous as a portrait painter, among the most famous of his paintings being *The Banquet of the Officers of the Arquebusiers of Saint George*, in which he displays the remarkable feeling for artistic groups and high coloring which distinguished all his works. Others are *The Officers of Saint Andrew*, *The Shooting Gallery*, *The Governors of the Elizabeth Hospital*, *The Artist and His Wife in the Park* and *Nurse with Child*. Hals was also distinguished as a *genre* painter, among his works being *The Jolly Trio*, *The Herring Vender* and *The Fool Playing a Lute*.

**Hal'stead**, MURAT (1829–1908), an American journalist, born in Butler County, Ohio. Beginning as local reporter on the *Cincinnati Commercial* in 1853, he became some years later its chief owner. In 1883 the *Commercial* and *Gazette* of Cincinnati were consolidated. Later he was editor of the *Brooklyn Standard-Union*, and, finally, he won fame as special correspondent of American papers during the Spanish-American War. Mr. Halstead exercised powerful influence in the councils of the Republican party in Ohio.

**Ham**, according to *Genesis* vi, 10, was one of the three sons of Noah. He was the ancestor of the people of Egypt, Babylonia and Canaan.

**Ham**, the name usually given to the cured thigh of the ox, sheep or hog, particularly the last. The curing of hams forms an important



## Hamadryad

part of the meat-packing industry. For ordinary trade they are first pickled in brine, then smoked in large chambers, built especially for the purpose. The smoking is done with hickory wood and powdered mahogany. Each nation has its own method of curing hams, and the packing houses try to conform to these customs for their export trade. Originally, ham meant the hind part or angle of the knee. See PORK; MEAT-PACKING.

**Ham'adry'ad.** See NYMPHS.

**Hamburg,** *hahm'boorK*, one of the free cities of Germany, a member of the German Empire and the greatest commercial port on the continent of Europe, is situated about 80 mi. from the North Sea in a low plain, along the north branch of the Elbe. Numerous beautiful suburbs surround the city. From the Elbe proceed canals which intersect the eastern and lower part of the city in all directions; the town is also intersected by the Alster, which here forms two fine basins, the Binnenalster and Aussenalster. The chief commercial street of Hamburg is the Jungfernstieg, while the center of the business of banking and exchange is the Neuerwall and Alterwall. Among the principal buildings are the Exchange, the Rathaus, the German Theater and the churches of Saint Nicholas and Saint Michael. The city owns its water plant, sewage disposal plant, bath-houses, gas, electric lighting and street railway plants (operated by private companies). It has many fine schools and hospitals, a public library of 600,000 volumes, an art gallery and a notable museum.

The quays and harbor accommodation are very extensive, and, with its geographical location, give to Hamburg its importance as a shipping center and as a center of banking, exchange and marine assurance, carried on in connection with commerce. Its imports in 1904 amounted to \$617,768,857. Its manufactures, though large, are less important, including shipbuilding, tobacco and cigar making, iron founding, brewing, coffee roasting, chocolate making and others. A great many emigrants embark here.

The State of Hamburg embraces a territory of 158 square miles and includes the City of Hamburg, with a population of 931,035 in 1910, and fifteen rural districts, and outlying towns and bailiwicks, with a population of 83,600. The legislative power belongs to the house of burgesses, whose acts, except in matters of taxation and finance, are subject to the senate's veto. The executive power is vested chiefly in the senate, which is composed of eighteen

## Hamilton

members, chosen for life, of whom nine must have studied law or finance, and of the other nine seven must belong to the commercial class. The senate chooses a first and second burgo-master (or mayor) from its own number. The house of burgesses consists of 160 members, half of whom are elected every three years by the votes of all tax-paying citizens, while the other half are chosen partly by a much restricted franchise and partly by guilds and corporations.

Hamburg was founded by Charlemagne about 806. It initiated the Hanseatic League with Lübeck and Bremen in 1249 and rapidly grew until 1810, when it became a part of France and suffered under Napoleon's Continental System. In 1815 it entered the German Confederation and in 1871 became a part of the Empire, where it is represented in the Diet by three deputies.

**Ham'erton,** PHILIP GILBERT (1834-1894), an English etcher, painter and writer on art. His most important works include *A Painter's Camp in the Highlands* and *Thoughts about Art, Etching and Etchers* and *Painting in France After the Decline of Classicism*. From 1869 until his death, he was editor of the *Portfolio*, an art magazine which he founded.

**Hamil'car Barca,** *bahr'kah*, a great Carthaginian general, the father of Hannibal. While still a young man he was appointed to the command of the Carthaginian forces in Sicily, shortly before the close of the first Punic War, when the Romans were masters of almost the whole island. For several years he defied all the efforts of the Romans to dislodge him; but the defeat of the Carthaginian admiral, Hanno, compelled him to evacuate Sicily. A revolt of the returned troops, joined by the native Africans, was successfully repressed by Hamilcar. He then entered on a series of campaigns in Spain, where he founded a new empire for Carthage. He had brought the whole southern and eastern part of the country under Carthaginian rule when he was slain in a battle against the Vettones, 228 B. C. His great design of making Spain a point of attack against Rome was ably carried out by his son-in-law, Hasdrubal, and his son, Hannibal.

**Ham'ilton,** the capital of the Bermudas, on the coast of the largest island, near the middle of the group. It has a land-locked harbor. Population in 1911, 2627.

**Hamilton,** a city, the capital of Wentworth co., province of Ontario, Can., on Burlington Bay and Lake Ontario, 40 mi. s. w. of Toronto, on the Grand Trunk, the Canadian Pacific and

## Hamilton

other railroads. It has various industries, including cotton mills, flour mills, an iron foundry, stone foundries, wire works, screen works, canning factories and rolling mills. It is in the center of a rich fruit region. A few miles east is the battlefield of Stony Creek, and on the west of the city is Burlington Heights, both famous in the War of 1812. Population in 1911, 81,969.

**Hamilton, OHIO**, the county-seat of Butler co., 25 mi. n. of Cincinnati, on the Great Miami River and the Miami & Erie Canal and on the Cincinnati, Hamilton & Dayton, the Pittsburg, Cincinnati, Chicago & Saint Louis and other railroads. The industries include paper, flour and woolen mills, foundries, machine shops, breweries, and manufactories of tools, agricultural implements, safes and other articles. The surrounding country is agricultural, and there is a good trade in farm produce. General Arthur Saint Clair built a fort here in 1791 and called it Fort Hamilton, in honor of Alexander Hamilton. A settlement grew up around this and was first incorporated in 1810. Population in 1910, 35,279.

**Hamilton, ALEXANDER** (1757-1804), a distinguished American statesman, born in the



ALEXANDER HAMILTON

island of Nevis, West Indies. At the age of sixteen he became a student in Columbia College, New York, and early contributed some powerful letters to the discussion of pre-Revolu-

## Hamilton

tionary issues. On the outbreak of the war he received (1776) a commission as captain of artillery and soon attracted the attention of Washington, who appointed him his aid-de-camp and employed him in the most delicate and difficult affairs. In 1781 he left the service, studied law, became a delegate to Congress from the State of New York in 1782 and in 1787 was a conspicuous member of the convention called to revise the Articles of Confederation. He was a strong supporter of centralized government and of the Constitution as completed, and by the letters which he wrote to the *Daily Advertiser* of New York, afterward published under the title of *The Federalist*, he exerted great influence in favor of its ratification, especially in New York.

On the organization of the government in 1789, with Washington at its head, Hamilton was appointed secretary of the treasury. In this office he displayed a remarkable grasp of financial and political problems, being responsible for the establishment of a national bank and a United States mint, for the organization of a capable treasury department, for the imposition of customs and excise duties and for the assumption by the nation of the Revolutionary debts of the states. He resigned in 1795 and retired into private life. In 1798 he was appointed second in command of the provisional army, in the fear of a French war, and on the death of Washington, in 1799, he became commander in chief. In 1804 he became involved in a political dispute with Aaron Burr, then candidate for the governorship of New York, accepted a challenge for a duel and was mortally wounded. Hamilton was undoubtedly one of the greatest figures in American history, being distinguished as soldier, author, debater, legislator, financier, lawyer and administrator.

**Hamilton, GAIL.** See DODGE, MARY ABIGAIL.

**Hamilton, WILLIAM, Sir** (1788-1856), a metaphysician, logician and philosopher, of the Scottish school. Having studied and gained distinction at Glasgow, in 1809 he entered Balliol College, Oxford, where he gained first-class honors. In 1829 the publication in the *Edinburgh Review* of his celebrated critique of Victor Cousin's system of philosophy gave him at once a first place among the philosophical writers of the time. He was appointed to the chair of logic and metaphysics in Edinburgh University in 1836. Hamilton's chief works are *Discussions on Philosophy and Literature* and *Lectures on Metaphysics and Logic*.



## Hamites

**Hamites** (descendants of Ham), the name given to a number of races in North Africa, who are regarded as of kindred origin and speak allied tongues. They include the ancient Egyptians and their modern descendants, Copts, Berbers, Tuaregs, Kabyles, Gallas, Falashas, Somali and Dankal.

**Hamlet** or **Am'leth**, a prince of Denmark who, according to tradition, lived about 200 B. C. Shakespeare's famous tragedy follows closely, in its main outline, the semi-legendary story of Hamlet, but varies in many of the details.

**Hamlin**, **HANNIBAL** (1809-1891), an American politician, vice-president of the United States, born in Maine. He learned printing, practiced law and served as a member of the legislature from 1835 to 1840. In 1842 he was elected to Congress and served until 1846, commanding attention as an anti-slavery man and, especially, as an advocate of the Wilmot Proviso (See **WILMOT PROVISIO**). In 1848 he became United States senator as a Democrat and was reelected in 1851, but joined the Republican party. He was elected governor of Maine in 1856. He returned to the Senate the following year, but was elected vice-president in 1860, was again chosen United States senator in 1869 and served until 1881, when he was appointed minister to Spain.

**Hammer**, a tool used for driving nails, beating metals and other similar purposes. The hammer has two parts, the head and the handle. Before metals were known stones were used for hammers. The indians made handles by cutting a groove around the stone and twisting a green branch of a tree or shrub around it so it would fit tightly into the groove. When dry the handle became stiff and the arrangement made a very good hammer. The common carpenter's hammer has a face and a claw. Between these is the eye for the handle. The face has usually a flat surface and is made of hard steel. In using the hammer it should be held firmly in the hand, which should grasp the end of the handle. In drawing nails, care needs to be taken so as not to bend the nail as it is drawn. This can be prevented by placing a little block under the hammer after the nail has been started. If the nail is long, a thicker block may be necessary before it has been completely drawn. Hammers of various shapes and styles are made for different kinds of work. See **STEAM HAMMER**; **TRIP HAMMER**.

**Hammer**, **THROWING THE**. See **ATHLETICS**.

## Hampton

**Ham'merhead** or **Hammerhead Shark**, a shark named because of its extraordinary head, which resembles a double-headed hammer, with eyes at the end of the projections. There are a number of species inhabiting warm seas, and one species is found on the coast of the United States. All species are savage and dangerous.

**Hammock**, a rectangular piece of cloth or netting, about six feet long and four feet wide, gathered together at the two ends and hung horizontally, forming a kind of bed, or place in which one may recline for pleasure. Hammocks are the common beds in use on board ships of war. The word is said to be of Caribbean origin.

**Hammond**, **IND.**, a city in Lake co., 21 mi. s. e. of Chicago, on the Grand Calumet River and on the Erie, the Baltimore & Ohio, the Michigan Central, the Wabash and several other railroads. It is in an agricultural region and has growing importance as a commercial and manufacturing center. The city contains a large distillery, meat-packing plants, brick-yards, tanneries, foundries, flour mills, chemical works and manufactories of steel springs, starch, glue, nails and other articles. Population in 1910, 20,925.

**Hampden**, **JOHN** (1594-1643), an English statesman, famous for his opposition to taxation by prerogative. He entered Parliament at the beginning of Charles I's reign and served in the first three Parliaments (1625, 1626, 1628). Although he attracted some attention in 1627 by refusing to contribute to a forced loan, it was not until ten years later that his resistance to Charles's demand for ship-money brought him generally before the public. Although Hampden's contention was the reasonable one, that an inland county should not be forced to pay ship-money in time of peace, and although he himself argued his case ably, he was condemned. The popular opposition to the decision against Hampden greatly increased the hatred of Charles I and his arbitrary measures. Of the Short Parliament and the Long Parliament of 1640, Hampden was a member, and he was one of the five members whom the king in January, 1642, attempted to arrest. As commander of a regiment in the Parliamentary army, Hampden took part in a skirmish at Chalgrove Field in June, 1643, and was killed.

**Hampton**, **WADE** (1754-1835), an American soldier, born in South Carolina. He served in the Revolutionary War and was a member of the United States Congress from 1795 to 1797

## Hampton

and from 1803 to 1805. He also took active part in the War of 1812, but failed to uphold his reputation as a soldier.

**Hampton, WADE** (1818–1902), an American soldier and politician, born at Columbia, S. C., and educated in law at the state university. He did not begin practice, however, but confined his attention to the management of his vast estate. Though a Democrat, Hampton favored the Union party until the secession of his state, when he joined in the movement for the Confederacy. He equipped a private command known as Hampton's Legion, which rendered valuable service to the Confederates throughout the war, especially at the first Battle of Bull Run and in the Peninsula Campaign. Hampton was commissioned brigadier general of cavalry, was with Lee in his second invasion, was wounded at Gettysburg and became a major general in the following August. He also opposed Sheridan in the Shenandoah Valley in 1864 and for his service in that campaign was made lieutenant general and commander of all the Confederate cavalry. Later he was with Johnston in opposing Sherman's northward march from Savannah. After the war he did his utmost to heal the wounds of the South and to foster loyalty to the reunited nation. He was elected governor of South Carolina in 1876 and two years later entered the United States Senate, where he served until 1891. Two years later he was appointed United States commissioner of railroads, serving until 1897.

**Hampton Court Conference.** Shortly after James I of England came to the throne, he granted to the Puritans a conference, with the hope that compromise and agreement might be arrived at. The Puritans presented a petition for certain reforms within the Church and for a relaxation of the strict laws in favor of the whole of the Prayer Book. James, however, angered by the use of the word *presbyter*, which reminded him of the Presbyterianism he had so hated in Scotland, gave an adverse decision, and the opposition of the Puritans to the House of Stuart began at this time.

**Hampton Normal and Agricultural Institute**, an institution for the education of negroes and indians, established at Hampton, Va., in 1868, under the auspices of the American Missionary Society and through the inspiration of General S. C. Armstrong, who was its first superintendent. The school is located on a farm and contains nearly sixty buildings, including dormitories, recitation halls, shops, a trade

## Hampton Roads Conference

school, a building for domestic science and agriculture, a church, a hospital, a gymnasium, a library, a sawmill and a planing mill. The institution maintains both collegiate and academic departments, and in addition to this it provides instruction in theory and practice in nearly all lines of industry. Courses in carpentry, blacksmithing, painting and other handicraft are open to the men, while the girls are instructed in all lines of work pertaining to the home. A large stock farm of 600 acres is owned by the school and is cared for by the students. The expenses of the institution are met by contributions, but students are required to pay their board, which most of them do by working.

The influence of this institution on the education of the negro has been beyond measure, since many of its graduates have established similar schools in various parts of the country, the most noted of these being the Tuskegee Institute and Normal School, established by Booker T. Washington. See NEGRO, EDUCATION OF; INDIAN, EDUCATION OF; TUSKEGEE NORMAL AND INDUSTRIAL INSTITUTE.

**Hampton Roads.** See CHESAPEAKE BAY.

**Hampton Roads, BATTLE OF.** See MONITOR, THE.

**Hampton Roads Conference**, in American history, a famous conference held on a vessel near Fort Monroe, February 3, 1865, between President Lincoln and Secretary of State Seward, on the part of the United States government, and Vice-President Alexander H. Stephens, Senator Robert M. T. Hunter and Assistant Secretary of War John A. Campbell, for the Confederacy. The conference was the result of the efforts of Francis P. Blair, who hoped, by securing the cooperation of the Federal and Confederate armies against the French in Mexico, to secure a reunion of the sections and the abolition of slavery. President Lincoln refused to make any treaty with the Confederate government, as such, and consistently declined to consider any peace proposal which did not include the immediate restoration of the Union and the laying down of the arms of the Confederate armies. He declared in favor of the admission of the Southern states to representation in Congress, but only on the condition that every state should concede the validity of the Emancipation Proclamation and thus put an end to slavery within its territory. The conference lasted four hours, but accomplished nothing.



## Hamster

**Hamster**, a genus of rodent animals, belonging to the family of mice and closely allied to the rats, which they resemble. They are distinguished by their short, hairy tails and their cheek pouches, in which they convey grain to their winter burrows. The common hamster is from ten to twelve inches long. Hamsters are found in central Europe and Asia.

**Hancock, MICH.**, a city in Houghton co. opposite Houghton, on Lake Portage and on the Duluth, South Shore & Atlantic and the Copper Range railroads. The village is in the Lake Superior copper region, near the famous Calumet and Hecla mines, and contains smelting works, foundries, machine shops and other industrial establishments. It is the seat of a Finnish college. The place was settled in 1859 and was incorporated in 1863. It has increased in population about one-half during the four years following 1900. Population in 1910, 8981.

**Hancock, JOHN** (1737-1793), a Revolutionary patriot and statesman, born in Quincy, Mass. In the inception of the Revolutionary struggle



JOHN HANCOCK

he was a leading spirit, working both with voice and pen, and the attempt to arrest Hancock and Samuel Adams on a charge of treason was one cause of the Battle of Lexington (See LEXINGTON, BATTLE OF). Hancock was a member of

## Hand Ball

the Continental Congress from 1775 to 1780, also from 1785 to 1786, and served as president of the body from 1775 to 1777, in that capacity being first signer of the Declaration of Independence. He served as governor of Massachusetts twelve years. As a legislator he was not especially broad-minded or far-seeing, but was always persistent and courageous.

**Hancock, WINFIELD SCOTT** (1824-1886), an American soldier, born in Pennsylvania, educated at West Point. He participated in the important battles of the Mexican War and was brevetted first lieutenant for bravery at Contreras and Churubusco. In 1861 he was made brigadier general and given command of a brigade in the Army of the Potomac. He fought at Williamsburg and at Antietam, at Fredericksburg led his men through such a fire as has rarely been encountered in warfare and at Gettysburg was dangerously wounded. In 1866 he was appointed major general in the regular army, and in the following year he was placed in charge of the reconstruction in Louisiana and Texas. This position he did not hold long. In 1880 he was the Democratic candidate for the presidency of the United States, but was defeated by Garfield.

**Hand Ball**, an old game, sometimes called the national game of Ireland, played by two or four persons with an elastic ball, which is knocked with the hand against a wall. Lines are drawn on the wall and on the ground, and when the ball goes outside these lines it is supposed to have struck a side wall. The back board is the boundary on the side. The service line is drawn half way between and parallel to the front wall and back board. The man who begins the game is called the *striker* and stands inside the service line, while his opponent, the *player*, stands outside of it. The striker bounds the ball on the ground and strikes it with his hand so that it rebounds from the front wall. The ball must rebound outside of the service line. If it fails to do so two successive times, or if it bounds on a side wall before striking the front wall, or if it bounds outside the back board, it is called a *hand out* and the players change places. If the ball is properly served, it must be struck by the player either before it strikes the ground or after the first bound, so that it strikes the first wall. This is a return. If the player fails to return the ball, the striker scores one point. If the player returns it properly, the striker must bound it again from the front wall, and if he fails to do

## Handel

so they change places. After the ball has been served, it may strike the ground anywhere inside the court. When the striker has scored or made a hand out, an inning has been played and the players change positions. The striker continues to serve after he scores, and an inning closes only when there is a hand out. The person who first makes 21 points wins the game.

**Han'del**, GEORGE FREDERICK (1685-1759), a German composer, born at Halle on the Saale. In 1696 he was sent to Berlin to study; later he returned to Halle and was appointed organist of the cathedral in 1702, but soon left to visit Hanover and Hamburg, where he played second violin in the orchestra. In 1704 he published his first work, an oratorio on the Passion, and his first opera, *Almira*, followed by his *Nero*. He visited England twice, and ultimately, having received a pension from Queen Anne, settled there. He was placed at the head of the newly-founded Royal Academy of Music. He produced in succession *Israel in Egypt*, *L'Allegro* and *Il Penseroso*, *Saul* and *The Messiah*. The last mentioned, which is his chief work, was brought out in 1741, for the benefit of the Foundling Hospital in Dublin. It was not much appreciated at the first presentation, but increased in reputation every year, until to-day it is considered the greatest oratorio ever written. In 1752 Handel became blind, but continued to perform in public and to compose. He was buried in Westminster Abbey.

**Hand'icap'ping**, a name given to the practice of placing some extra burden upon those who, in competition, have by previous performance showed their ability to do things more successfully than their competitors. In athletic events records are kept of what is accomplished by all the men; then some official, who is agreed upon, handicaps those men who need it, in such a way that apparently all are on a fair and even basis. In the races the best men start from the "scratch" and run the full distance, while others are allowed to start at different marks in front of the "scratch" line, according to the decisions of the handicappers. In horse racing the handicap is sometimes accomplished by requiring a heavier jockey to ride the horse or by weighting the saddle. In the various games different methods are used to bring about equality.

**Hand Organ**. See HURDY-GURDY.

**Hangbird**. See BALTIMORE ORIOLE.

**Hang-chow**, *hahng'chow*, or **Hang-choo**, a large city in China, capital of the Province of Che-kiang, on the estuary of the Tsien-tang-

## Hanna

kiang. It is one of the handsomest cities in China, with many magnificent temples, monuments and triumphal arches, and it is washed on its western side by the Hsi-hu, or West Lake, a sheet of water famous for its beauty. Hang-chow is the seat of the imperial silk factory and has extensive private manufactures in silks, furs, gold and silver ornaments, tapestries, lacquered ware and fans. The greater portion of the inhabitants live without the walls in the beautiful suburbs and in boats on the river. The city is also a great center of literary and ecclesiastic life. It was opened to foreign trade in 1896. Population in 1910, estimated, 350,000.

**Hanging**, the most common method of inflicting capital punishment. The method is sufficiently described by the sentence which is usually pronounced by the court, that the convict "be hanged by the neck until he is dead." The sentence also fixes the time and place for the execution. Hanging has been generally adopted for the reason that it is generally considered the most humane method of capital punishment, though in recent years it has been superseded in some states by electrocution (See ELECTROCUTION). The execution was formerly a public ceremony, but in later times the tendency has been to avoid publicity.

**Hanging Gardens of Babylon**, the name commonly given to a structure of ancient Babylon, built by Nebuchadnezzar to please his queen, and famous as one of the seven wonders of the ancient world. These gardens were merely a series of terraces, forming a sort of tower or pyramid, planted with trees, flowers and shrubs. Men were constantly employed in pumping water from the Euphrates for irrigation.

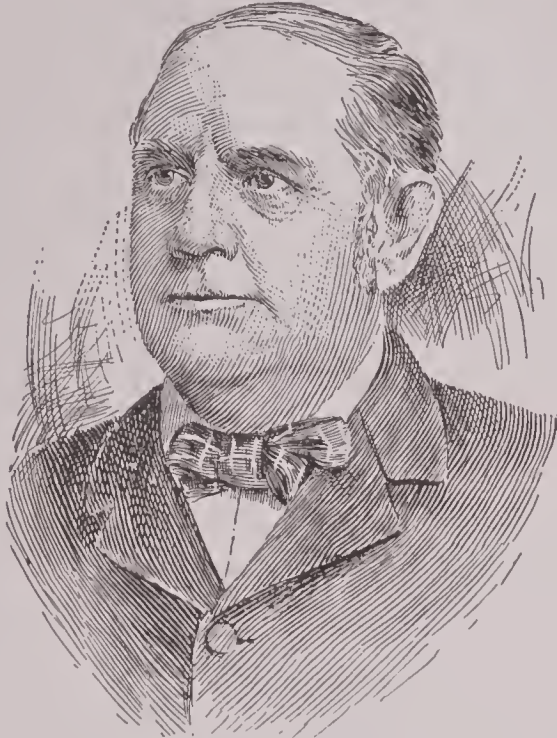
**Hankow**, *hahn'kow*, (mouth of the Han), a town and river port in China, in the province of Hupeh, at the junction of the Han with the Yang-tse-kiang. The native portion of the city is dirty and crowded, but the foreign settlement, occupied by British, French, Russian and German residents, stretches for three miles along the river and is beautifully laid out, substantially built and well kept. The port of Hankow was opened to foreign trade in 1862 and has become the chief distributing center for the central provinces. The chief articles of export are tea, rice, silk, tobacco, medicines and wood oil. Population, estimated at 800,000.

**Hanna**, MARCUS ALONZO (1837-1904), an American capitalist and politician, born at New Lisbon, Ohio. He removed with his father to Cleveland, where he gained large



## Hannibal

business interests. Turning his attention to politics, he became Republican leader of his ward, city and state, and he was chairman of the Republican National Committee from 1896 to 1904, being special sponsor for William



MARCUS HANNA

McKinley as a candidate in the convention of 1896. He was elected United States senator in 1897 and was reëlected in 1903. Hanna was identified with the National Civic Federation, was for a time its president and was always one of its most prominent and useful members.

**Han'nibal** (247-183) B. C., one of the greatest generals of antiquity, the son of Hamilcar Barca. While but a child he was made to take an oath of lasting enmity toward the Romans. At the age of twenty-two he went from Carthage to the army in Spain, then commanded by his brother-in-law, Hasdrubal, and three years after, on the murder of Hasdrubal, he received the chief command by acclamation. He now prepared to carry out his great designs against Rome, and judging that the Romans could be overthrown only in Italy, he undertook his great march on Rome across the Pyrenees, the Rhone and the Alps. He set out with ninety thousand foot soldiers, twelve thousand horsemen and thirty-seven elephants, but this force was considerably lessened before he attempted the passage of the Alps. When he arrived at the southern foot of the Alps, after fifteen days of incredible toil in crossing the mountains, his force numbered only about twenty-six thousand.

## Hannibal

The point at which he crossed is generally believed to have been the Little Saint Bernard. On the banks of the Ticino he first encountered a Roman army under Scipio and defeated it, mainly by the superiority of his Numidian cavalry, 218 B. C.

Hannibal opened the next year's campaign by defeating the Roman general Flaminius, and he then marched into Apulia, spreading terror wherever he approached. Rome, in consternation, chose as dictator Fabius Maximus, who sagaciously resolved to hazard no more open battles, but to exhaust the strength of the Carthaginians by delay. In 216, however, a battle was fought at Cannae, which ended in a total defeat for the Romans, forty or fifty thousand of whom were slain. Instead of marching on Rome, Hannibal now sought quarters in Capua, where luxurious living undermined the discipline and health of his troops. The campaigns of 215, 214 and 213 were comparatively unimportant.

After this the Romans, realizing the wisdom of the old policy of Fabius, refrained from open engagements and shut themselves up in their walled towns, against which Hannibal's army proved ineffective. However, he still maintained the contest against overwhelming odds, till, in 203, he was recalled to defend his country, invaded by Scipio. In Africa he was defeated by the Romans at Zama (202 B. C.), and the Second Punic War ended, after a bloody contest of eighteen years, in Carthage having to accept the most humiliating conditions of peace. Hannibal now devoted himself as civil magistrate to restoring the resources of Carthage, and he was working at reforms of administration and finance when the jealous Romans sent ambassadors to demand his surrender. He fled to the court of Antiochus of Syria and offered his services for the war then commencing against the Romans. They were accepted, but Hannibal's advice for the conduct of the war was not followed, and he himself, as commander of the Syrian fleet, failed in an expedition against the Rhodians. Hannibal, again obliged to flee, took refuge with the king of Bithynia, and he is said to have gained several victories against the king of Pergamus, an ally of the Romans. But the Roman Senate once more sent to demand the surrender of their inveterate enemy, and Hannibal took poison rather than fall into their hands.

**Hannibal**, Mo., a city in Marion co., about 100 mi. n. w. of Saint Louis, on the Mississippi

## Hanoi

River and on the Chicago, Burlington & Quincy, the Wabash and other railroads. It is an important lumber market, has a large trade in agricultural produce and contains flour mills, foundries, car works and manufactures of stoves, clothing, shoes, cement and other articles. A large iron and steel bridge connects the city with East Hannibal, Ill. The city has a number of good public buildings, and a well organized system of public schools. The place was settled in 1819 and was incorporated twenty years later. Population in 1910, 18,341.

**Hanoi**, *hak'no e*, the capital and most important city of the province of Tongking, and the seat of the government of French Indo-China. It is located on the Songkoi, or Red River, on a very picturesque site. Its wide streets, some of them lighted with electricity, and its well-built houses of brick, mud or timber make it a very attractive city. The most noteworthy building of the town is the cathedral. As a commercial center the city is important, although by far the greater part of the trade is in the hands of the Chinese. Silk, rice, embroidery and pearl work are largely exported and there is also considerable trade in filigree work, leather articles and mats. Hanoi has belonged to France since 1882. Population, about 102,000.

**Han'over**, formerly a kingdom in the northwest of Germany, now a province of northwest Prussia. For administrative purposes it is divided into six districts, Hanover, Hildesheim, Lüneburg, Stade, Osnabrück and Aurich. The province is drained by the Elbe, Weser and Ems rivers. The Harz Mountains, in the southeast, are rich in minerals, the working of which is an important industry. The soil in the lowlands is very fertile and produces all kinds of grains, flax, hops, tobacco and potatoes. The manufactures consist of cotton, woolen goods, leather and machinery, and shipbuilding is an important industry. The chief seat of learning is the University of Göttingen. Hanover is the capital.

The early history of Hanover is that of Brunswick. It was made an electorate in 1692. Its elector, George Louis, in 1714 became George I of England, and at this time Hanover began to grow in importance, until in 1814 it was made a kingdom by the Congress of Vienna. When Queen Victoria became queen of England, Hanover, by the Salic Law, went to the nearest male heir, Ernest Augustus, duke of Cumberland, who was succeeded by his son, George V. In the war between Austria and Prussia in 1866, Hanover took the side of Austria, and the result

## Hanseatic League

was its annexation to Prussia by the Peace of Prague. Population in 1910, 2,942,436.

**Hanover**, capital of the Prussian province of Hanover. Hanover is a manufacturing town of great importance, has cotton factories, machine works, iron foundries, chemical works, tobacco and cigar factories and other industries. It is also a railroad center and within a few years has become the fifth city in size in Prussia and the tenth in all Germany. Like other German towns, it has an old city and a new city, the latter adorned by fine monuments, public buildings and residences and noted as the seat of educational institutions of importance. Hanover was founded before 1100 and joined the Hanseatic League in 1481. It became the residence of the dukes of Brunswick-Lüneburg and capital of the principality in 1636. Population in 1910, 302,375.

**Hanover**, PA., a borough in York co., 42 mi. n. w. of Baltimore, Md., on the Pennsylvania and the Western Maryland railroads. It is in a fertile agricultural region near deposits of iron ore; the industries include the manufacture of shoes, cigars, carriages, machinery, gloves and other articles. The town also has a large trade in live stock and dairy and farm produce. Population in 1910, 7057.

**Hans'brough**, HENRY CLAY (1848- ), an American politician, born in Randolph County, Ill. He moved to California in 1867, became a printer, later publisher of a daily paper at San Jose and was for a time connected with the San Francisco *Chronicle*. He was an editor at Baraboo, Wis., for two years, but in 1882 he removed to Devil's Lake in Dakota, then a territory. He was twice elected mayor of the city and from 1889 to 1891 sat in the House of Representatives. In the latter year he was elected United States senator and was twice reelected.

**Han'seat'ic League** or **Hansa**, THE, a league of certain German and other commercial cities of northern Europe, for the protection of commerce. In the middle of the thirteenth century, the sea and land swarmed with pirates and robbers, who infested the thriving ports of the Baltic and the North Sea. A compact was made, therefore, between Hamburg and Lübeck, to keep open the road across Holstein, connecting the North Sea with the Baltic. In 1247 this league was joined by Brunswick, and out of this grew the Hansa, which at its most flourishing period included about eighty-five towns, maritime and inland. Among these the town of



Lübeck was recognized as the chief, and here the deputies of the other Hanse towns assembled to deliberate on the affairs of the confederacy. During the fifteenth century the power of the league was at its height. It had armies and navies, gained victories in war over the kings of Norway and Denmark, and deposed a king of Sweden. It made thorough provision for the security of commerce on the Baltic and North seas, constructed canals, introduced a uniform system of weights and measures and developed the principles of mercantile law. But as its power and ambition increased it was felt to be an oppressive monopoly, established mainly in the interests of the great seaport towns. It became less needful, also, for commercial security, since the princes learned the advantages of trade, formed naval forces of their own and encouraged navigation. Most of the inland members of the confederation withdrew, and during the fifteenth and sixteenth centuries the cities of Hamburg, Lüneburg and Lübeck were almost alone in their active efforts to maintain the power of the Hansa.

**Hansen**, GERHARD (1841- ), a Norwegian physician, noted for his discoveries concerning leprosy. He traveled extensively and investigated the disease wherever he found it, and he finally discovered the cause of the disease to be a bacillus. Although he was unable to discover any treatment which was effective in curing leprosy, yet by establishing the nature of the contagion he has limited its spread not only in Norway but everywhere.

**Hansom** or **Hansom Cab**, a two-wheeled covered carriage, drawn by one horse. It has a low body, is closed in front with doors and has an elevated seat in the rear for the driver. Hansoms are often used in place of cabs in large cities.

**Hapsburg**, *hahps'boorK*, or **Habsburg**, HOUSE OF, the imperial house of Austria-Hungary. The name, which is a contraction of *Habichtsburg*, meaning "Hawk's Castle," is taken from the castle of Hapsburg, in the canton of Aargau. This castle, it is believed, was built in the eleventh century by Bishop Werner of Strassburg, and Werner II was the first to take the title of count of Hapsburg. Rudolf and Albert, the great-grandsons of Werner II, were founders of the Hapsburg-Lauffenburg line and the present imperial line, respectively. Rudolf, the son of Albert, became Holy Roman emperor as Rudolf I in 1273, and his son succeeded him in 1298 as Albert I. In 1438 the family again came to the imperial throne, and from that time until 1806

all the rulers of the Holy Roman Empire except two were Hapsburgs.

**Hara-kiri**, *hah'ra ke're*, or **Seppuku**, *sep-poo'ku*, a mode of suicide allowed in old Japan to criminals of the Samurai, or two-sworded class, as more honorable than public execution. It consisted in making two cuts in the abdomen, in the form of a cross. This mode of death was also frequently practiced to save dishonor or exposure. To the present day the custom is occasionally resorted to as a method of suicide. General Nogi committed hara-kiri in 1912.

**Harbor**, a general name given to any bay, creek or inlet of the sea, affording accommodation for ships and protection against the wind and sea. The chief requisites of a good harbor are accessibility, adequate depth of water and shelter from violence of wind and water. Harbors are either natural or artificial, the latter being made wholly or partly by the construction of moles, or breakwaters, and by dredging. In connection with the more important harbors, there are usually docks, in which the water is kept as nearly as possible at the same level, thus giving facility for loading and unloading. A *harbor of refuge* is primarily for shelter and must be protected by natural or artificial breakwaters.

**Harcourt**, *hahr'kort*, WILLIAM GEORGE GRANVILLE VENABLES VERNON, Sir (1827-1904), an English statesman. He was educated at Trinity College, Cambridge, was called to the bar in 1854 and became queen's counsel in 1866. In 1868 he was returned to Parliament for Oxford as a Liberal, and he soon distinguished himself by his powers of satire and ridicule in debate. He became home secretary in 1880, when he lost his seat for Oxford, but was returned for Derby. In 1886 he was made chancellor of the exchequer; and after the resignation of Gladstone's ministry and the division of the Liberal party, he became a prominent leader of the Gladstone section. Later, he was leader of the Liberal party during the supremacy of the Conservatives.

**Har'decanute** or **Harthacnut** (about 1019-1042), king of England and Denmark, the son of Canute. At the time of his father's death in 1035 he was in Denmark, where he was immediately recognized as king. His half-brother Harold, however, who happened to be in England at the time, laid claim to that part of their father's dominions and succeeded in getting possession of Mercia, Northumbria and Wessex. He died in 1040, and Hardecanute peacefully succeeded him. He nominally reigned until his death, but

## Hardenberg

the government was almost entirely in the hands of his mother and the powerful Earl Godwin.



THOMAS HARDY

**Hardenberg**, *hahr'den berK*, KARL AUGUST, (1750–1822), a celebrated Prussian statesman. He was in the service of the margrave of Ansbach when that territory was united to Prussia in 1791, and Hardenberg was received into the Prussian service as minister of state. When war broke out between France and England in 1804, Hardenberg attempted to keep Prussia out of the struggle, and when, after the Battle of Austerlitz, Prussia was compelled to make an alliance with France, he resigned. When this alliance was dissolved later in the same year, Hardenberg was restored to power, but was again dismissed after the Peace of Tilsit, at the demand of Napoleon. In 1810 he was made chancellor of Prussia, and he zealously carried out Stein's plans for the reorganization of the Prussian states, laboring especially to arouse the national feeling in Prussia.

**Hardness**, the quality of bodies which enables them to resist indentation or scratching by other bodies. The diamond is the hardest of all natural substances. The degree of hardness of some metals is changed by heating and cooling. Iron and steel are made harder by heating to redness and cooling quickly. But if cooled slowly they are made softer. Copper is hardened by cooling slowly and softened by cooling quickly. See ABRASIVES; ANNEALING.

## Hare

**Hardy**, *hahr'dy*, THOMAS (1840– ), an English novelist, born in Dorsetshire, England. He was educated as an ecclesiastical architect and for a time worked at that profession. From 1868 he devoted himself to literature, and his first novel, *Desperate Remedies*, was published in 1871. This was succeeded by *Under the Greenwood Tree*, *A Pair of Blue Eyes*, *Far from the Madding Crowd*, *The Return of the Native*, *Two on a Tower*, *Tess of the D'Urbervilles* and *Jude the Obscure*, these last two being his most notable works. Hardy's most prominent characteristics are his strict realism and his fatalistic attitude, which regards men as helpless victims of uncontrollable circumstances.

**Hare**, the common name of a small animal with long ears, long hind limbs, by which it moves in long leaps, a short tail and soft hair.



HARE

The hare is distinguished from the rabbit by the fact that the former does not burrow, but builds nests in the ground, where the young are born. The common hare is found throughout Europe and in some parts of Asia. It is tawny red or brown on the back and white on the belly and is about two feet long. The *mountain hare*, or *varying hare*, confined to Northern Europe and the mountainous regions of the South, is smaller than the common hare and becomes white in winter. The *American hare*, not much larger than a rabbit, is found in most parts of North America. In North America there are also the *polar hare*, a variety of the varying hare, but of superior size and purer color, and the *prairie hare*, known as the *jack-rabbit*, from its size and length of limb. The hare, which has no courage and little cunning, is protected from its enemies mainly by its sharp sight and hearing and its extraordinary fleetness. Its voice is



## Harebell

never heard except when the animal is seized or wounded. It then utters a sharp, loud cry, not very unlike that of a child. Its flesh is rather dry, but it is much prized because of its peculiar flavor. Some domestic species, such as the Belgian hare, are raised in large numbers for market.

**Harebell**, the Scotch bluebell, a plant having a slender stem, from 4 to 6 inches high, bearing one or more bell-shaped blue flowers. Occasionally the flower is white. The harebell is common on dry and rocky soil in most districts of Europe. There are also several well-known American species.



HAREBELL

**Ha'rem** (the prohibited) is used by Mussulmans to signify the women's apartments in a household, forbidden to every man except the husband and near relations. The word is also applied to the women themselves. The women of the harem may consist simply of a wife and her attendants, or there may be several wives and an indefinite number of concubines, or female slaves. The greatest harem is that of the sultan of Turkey. The women of the imperial harem are all slaves, generally Circassians or Georgians. Their life is spent in bathing, dressing, walking in the gardens, witnessing the voluptuous dances performed by their slaves and in spinning or working with the needle. The women of other Turks enjoy the society of their friends at the baths or in each other's houses and appear in public, accompanied by slaves and eunuchs; but the women of the sultan's harem have none of these privileges. It is of course only the richer Moslems who can maintain harems; the poorer classes have generally but one wife. American and European ladies have entered oriental harems during the past two centuries and studied the lives of the inmates. See ZENANA.

**Hargreaves**, *hahr'greevz*, JAMES (1720-1778), an English inventor. In 1760 he invented a machine for carding cotton, and some years afterward produced the spinning jenny, by which he was able to spin with several spindles at once.

## Harley

Suspecting that he employed machinery, his neighbors broke into his dwelling and destroyed his machine. Manufacturers stole his designs, and he was unable to secure patents upon them, so that he never profited much by his inventions, though they, with the power loom, invented by Cartwright, revolutionized the cotton industry of the world.

**Harlan**, *hahr'lan*, JOHN MARSHALL (1833-1911), an American jurist, born in Boyle County, Ky. He graduated from Center College in 1850 and studied law at Transylvania University, began practice in 1853 and became county judge in 1858. He took part in the Civil War as a Union soldier, but from 1863 to 1867 he was attorney general of Kentucky. In 1877 President Hayes appointed him associate justice of the Supreme Court, where he served with distinction for more than thirty years. He was one of the commissioners in the Bering Sea arbitration in 1893.

**Harland**, HENRY (1861-1905), an American novelist, born in Saint Petersburg. He was educated in the College of the City of New York and at Harvard and afterwards traveled in Europe as a newspaper correspondent. In London he became known as the editor of *The Yellow Book*. His earlier novels, among which were *As It Was Written* and *The Yoke of Thora*, dealt with American-Jewish life and were written under the name of Sidney Luska. *The Cardinal's Snuff-box* is one of the most popular of his later works.

**Har'lequin**, a character of the Italian comedy, introduced into pantomimes in other countries. On the Italian stage he is a comic character, full of drolleries, tricks and knaveries, and somewhat resembles the English clown. The Harlequin of British pantomimes is somewhat different. He is supposed to be the lover of Columbine and possesses a wonder-working wand, with which he protects his mistress against Clown and Pantaloon, who pursue and endeavor to capture her, until the pursuit is brought to a termination by a good fairy. The Harlequin wears a tight dress of bright colors, glittering with spangles. In common usage the term has come to be almost interchangeable with clown.

**Harley**, ROBERT, Earl of Oxford and Mortimer (1661-1724), an English statesman. Although he was a Whig at the time of his entering Parliament his views changed, and after the accession of Anne, he, with his colleague, Saint John, afterwards Lord Bolingbroke, became leaders of the Tories. He was chosen speaker of the House of Commons in 1701 and in 1704

was appointed chief secretary of state, a position which he held for four years. After the fall of Marlborough, Harley again came to power and received the office of chancellor of the exchequer. Early in the reign of George I he was impeached of high treason, but he was acquitted.

**Harmon**, JUDSON (1846– ), an American lawyer and statesman, born in Newton, Ohio. He was judge of the Court of Common Pleas in 1876–78, and of the Superior Court from 1878 to 1887. In 1895 he was appointed Attorney General of the United States by President Cleveland. He was Democratic governor of Ohio for two terms, from 1909 to 1913.

**Harmon'ica**, Franklin's name for a musical instrument constructed with glasses of different sizes, revolved by means of mechanism worked by the foot and played upon by touching the rim of the glasses with the moistened finger. It constituted the "musical glasses" of Goldsmith's era. The name is now sometimes applied to the instrument commonly called the mouth organ.

**Harmon'ics**, the accessory sounds accompanying the predominant and apparently simple tone of any string, pipe or other sonorous body. No purely simple sound, that is, no sound whose vibrations are all of the same size, is producible in nature. When a sound is produced by the vibration of a string, the whole string vibrates as a unit, giving rise to a tone called the *fundamental*. The string, however, further divides into various sections, which vibrate separately and more rapidly and produce sounds differing from the fundamental, but bearing certain fixed proportions to it; these are its *harmonics*. The first harmonic of the fundamental note of any string is that produced by half the string and is the octave of the fundamental; the second harmonic is given by each third of the string and is the fifth, or dominant, of the fundamental note, and so on, the complete series of harmonics containing all the notes of the musical scale. But while harmonics enter into the composition of every musical sound, different vibrating bodies suppress some and emphasize others, thus producing different qualities of tone. See MUSIC; SOUND.

**Harmo'nium**, a small reed organ in which the bellows is operated by the feet of the performer. See ORGAN.

**Har'mony**, that part of the science of music which deals with chords, their structure and relations. It is a fundamental branch of musical theory and composition, and its importance can readily be seen from the fact that any simple

melody can be made to arouse widely different emotions when given different harmonic settings. Innumerable examples of this principle are found in the works of all great composers, for often the beauty and power of their compositions depend in large measure upon the harmonies which they are able to form about a single simple theme.

The same term is used to denote the concord of two or more strains or sounds, differing in pitch or quality, as opposed to melody, which consists of a pleasing series of single tones. See MUSIC; CHORD; COUNTERPOINT.

**Harmony of the Spheres**, a supposition of Pythagoras and his school, that the motions of the heavenly bodies produced a music which could not be heard by men. He supposed these motions to conform to certain fixed laws, which could be expressed in numbers corresponding to the numbers which give the harmony of sounds.

**Harmsworth**, ALFRED CHARLES WILLIAM, Sir (1865– ), an English journalist, born near Dublin. He was educated privately and at the Stamford Grammar School, and in 1882 he became editorial writer for the *Illustrated London News*. Six years later he began the publication of the weekly journal *Answers*. In 1894 he became editor and proprietor of the *London Evening News* and in 1896 founded the *Daily Mail*. Two years later he founded *Harmsworth's Magazine*, devoted to literature, science and politics. He is well known as the organizer and promoter of the Jackson-Harmsworth Arctic expedition of 1894. On a visit to the United States in 1900, he published a special issue of a New York daily paper, to indicate his views of the newspaper of the future. He was created Lord Northcliffe in 1905.

**Harness**, a tackle or working gear of a horse, mule or other draft animal, except the ox. Harness is usually made of leather, but in some countries it is made of leather and cords combined. Harness used with driving carriages is often highly ornamented with brass, silver or gold plate. The parts of the harness are shown in the cut. The blinds, however, are now generally omitted. (See illustration on next page.)

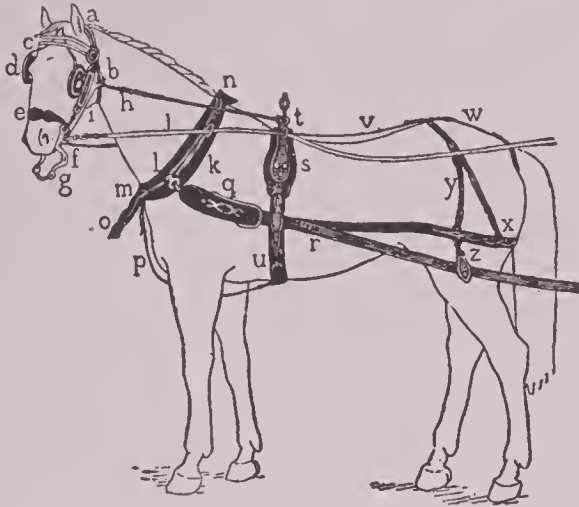
**Harold** or **Harald I** (about 850–933), king of Norway, one of the greatest monarchs of that country, succeeded his father in 863. He brought all the Norwegian jarls under his power and completely subjected the country. Among the conquered jarls was Rolf, who emigrated to France, where he obtained a grant of land and established himself as first duke of Normandy. Harold partially freed Norway from the pirates



## Harold

and brigands who had long disturbed the country.

**Harold** or **Harald III** (surnamed *Haardraade*, Hard Ruler) (1015–1066), king of Norway. He spent a number of years in Constantinople, as a member of the emperor's



a, crown; b, checkpiece; c, front; d, blind; e, nose-band; f, bit; g, curb; h, check; i, throatlatch; j, rein; k, collar; l, hame; m, hame-link; n, hame-strap; o, pole-strap; p, martingale; q, trace-tug; r, trace; s, saddle; t, terret; u, bellyband; v, turnback; w, crupper; x, breeching; y, hipstrap; z, trace-bearer.

bodyguard, and had many adventures in Sicily and at Jerusalem. In 1046 he returned to Norway and was made by the king, his nephew, joint ruler, and two years later, on the death of the king, he became sole ruler. He took part with Tostig, brother of Harold II of England, in his attempt to wrest the crown of England from Harold II, but was killed in the Battle at Stamford Bridge.

**Harold I** (surnamed *Harefoot*), a Danish king of England, who succeeded his father Canute in 1035 as king of the provinces north of the Thames and became king of all England in 1037. His countrymen, the Danes, maintained him upon the throne against the efforts of Earl Godwin in favor of Hardecanute, and Harold finally won the earl to his support. Harold died in 1040.

**Harold II** (1022?–1066), the last Anglo-Saxon king of England. His father, Earl Godwin, was constantly engaged in conflict with Edward the Confessor, but Harold became reconciled with Edward and on Edward's death in 1066 was proclaimed king by the nobles. William of Normandy asserted that Harold had taken oath to support his claims to the throne; and to avenge himself on Harold and gain possession of the crown, he invaded England in October, 1066, and met Harold at Senlac, near Hastings (See **HASTINGS, BATTLE OF**; **WIL-**

## Harper

**LIAM I, THE CONQUEROR**). Harold was killed in the battle.

**Harp**, a stringed instrument of great antiquity, still commonly played throughout the world and forming the national symbol of Ireland. The modern instrument is nearly triangular in form, and the strings are stretched from the upper part to one of the sides. It stands erect and is played with both hands, the strings being struck, or pulled, with both fingers and thumbs. The modern harp was perfected by the invention of pedals by Sebastian Erard in 1820. By means of these, two changes in the length of the strings can be made, with corresponding changes in pitch. The harp is commonly used with fine effect in orchestra music. Wagner's music at times calls for six or eight of the instruments in a single composition.

**Harper**, **WILLIAM RAINEY** (1856–1906), an American educator, born at New Concord, Ohio. He was educated at Muskingum College, afterwards became professor of Hebrew at the Baptist Union Theological Seminary in Chicago and in 1879 was elected professor of Semitic languages in Yale University. Later he was principal of the Chautauqua College of Liberal Arts and director of the Chautauqua system.



WILLIAM RAINEY HARPER

In 1891 he became president of the University of Chicago. Under his administration this university was developed and brought to a high

## Harper's Ferry

stage of excellence. Doctor Harper had a world-wide reputation as a student of Hebrew and other oriental languages. He was the author of *The Elements of Hebrew, Elements of Hebrew Syntax* and a number of other similar works. He was also editor of the *American Journal of Theology* and the *American Journal of Semitic Languages and Literature*, both published at the University of Chicago.

**Harper's Ferry**, W. VA., a town in Jefferson co., on the Baltimore & Ohio railroad, 55 mi. n. w. of Washington, D. C. Harper's Ferry had an interesting history in the Civil War. It was the scene of the famous raid of John Brown, Oct. 16, 1859 (See BROWN, JOHN). At the outbreak of the war it was abandoned by a small Union garrison and was occupied by Confederates, first under Colonel ("Stonewall") Jackson and afterward under Gen. Joseph E. Johnston. It was evacuated June 15, 1862, and afterward it was occupied by a Union force of 12,500, which in turn was captured by General Jackson, September 15, during Lee's first invasion of the North. Population in 1910, 766.

**Har'pies**, the ancient Greek goddesses of storms. Their parentage, ages, appearance, names and number are very differently given by the poets. In the Homeric poems they are merely storm winds. Hesiod represents them as two young virgins of great beauty, called Aëlle and Ocypete, but the later poets and artists vied with one another in depicting them under the most hideous forms, covered with filth and polluting everything in contact with them.

**Harpoon'**, a sort of spear used in killing whales and other large fish. The head has a sharp, wedge-shaped point, with barbs, and is usually of the same piece as the handle, which is about three feet in length. The harpoon is fastened to a long rope, that is coiled in the boat. When the boat approaches near the whale, the harpoon is thrust into his body. The rope can be paid out or taken up, as the safety of the boat requires. The bomb lance, which is a hollow harpoon containing a shell filled with gunpowder, is now used in catching whales. The lance is shot from a gun, and when it enters the body of the whale the bomb explodes and kills him instantly.

**Harpsichord**, *hahrp'se kord*, a keyed, stringed instrument, similar to a piano, but now rarely used. The keys were in front as in the piano, and when pressed by the fingers they raised little upright, oblong slips of wood, called *jacks*, furnished with crowquill plectrums, which

## Harris

struck the wires, causing them to vibrate and to give forth a sharp, thin tone. See PIANO.

**Harpy**, a large and very powerful eagle of the tropics, that sometimes strays as far north as the Southern United States. It is larger than the golden eagle, but has a somewhat shorter expanse of wing. Its bill is crooked; its claws are extremely strong and sharp, and the muscles of its shoulders are exceedingly powerful. The harpy is dark gray, barred with black above and white below, except for a dark band across its breast. Its head bears a handsome crest. It will defend itself even against man, when wounded, but in spite of the numerous stories told of its marvelous fierceness and strength, it is doubtful if it ever attacks man of its own accord. Its feathers are used by indians for decorative purposes and for giving accuracy to their arrows.

**Har'raden**, BEATRICE (1864— ), an English novelist, born at Hamsted. After studying in various English and European schools, she took her degree from the University of London. In 1894 and 1895 she traveled in the United States and lived for some time on a California ranch. Her *Ships that Pass in the Night*, published in 1893, became immensely popular, but her other works have never attained a like success. Among these are *In Varying Moods*, *The Fowler* and *Hilda Strafford*.

**Har'rier**. See MARSH HAWK.

**Harriman**, EDWARD HENRY (1848-1909), an American capitalist and railway owner, born at Hempstead, Long Island, the son of an Episcopal clergyman. At fourteen years of age he left school and went into a broker's office in New York. At twenty-two he became a member of the stock exchange and continued in the brokerage business until, in 1887, he was elected vice-president of the Illinois Central. His greatest work was the reorganization and rebuilding of the Union Pacific Railroad and this was followed by the acquirement of the Southern Pacific and its western connections. Besides the roads mentioned, the Illinois Central, Chicago & Alton, Baltimore & Ohio, Pennsylvania and others are owned by or closely allied with the Harriman system. His country estate at Arden, N. Y., contains 26,000 acres, largely woodland. His home was in New York City. He built a magnificent clubhouse on the East Side, where 10,000 poor boys are allowed to enjoy themselves.

**Harris**, JOEL CHANDLER (1848-1908), an American author, popularly known as 'Uncle Remus,' was born in Eatonton, Ga. He served apprenticeship to the printer's trade, then



## Harris

studied law and finally settled down to journalism. In 1876 began his connection with the *Atlanta Constitution*, which lasted for twenty-five years; and for this paper he wrote the first of those negro dialect fables which were afterward published as *Uncle Remus: His Songs and Sayings* (1880). These sketches received such a warm welcome that *Nights with Uncle Remus* and *Uncle Remus and His Friends* soon followed. The hero of these stories is "Brer Rabbit." Harris was one of the most popular southern writers of fiction. His stories form a valuable contribution to American literature, by reason of their intimate, faithful pictures of southern life and their accurate reproductions of negro dialect. His best works, besides those mentioned above, are *Daddy Jake, the Runaway*; *Sister Jane*; *Stories of Georgia*; *Free Joe*; *Aaron in the Wildwoods*; *Tales of the Home Folks*; *Balaam and His Master*, and *A History of Georgia*.

**Harris, WILLIAM TORREY** (1835-1909), a distinguished American educator, born at Kil-



WILLIAM TORREY HARRIS

lingly, Conn., and educated at Yale University, which he entered in 1854. He began teaching in Saint Louis, Mo., and became superintendent of the Saint Louis public schools in 1867. The same year he founded *The Journal of Speculative Philosophy*, which he long continued to edit. This was the first journal of the kind in

## Harrisburg

America and in the English language; it has contained many original articles by Doctor Harris on philosophical questions, as well as many translations from European writers. While superintendent of the Saint Louis schools, Doctor Harris became widely known through his reports, which showed remarkable insight into educational problems and were sought by educators at home and abroad. He was elected president of the National Educational Association in 1875 and represented the United States at the International Congress of Educators, which met at Brussels in 1880. In 1889 he prepared the official *Statement of the System of Education of the United States*, for the Paris and Vienna expositions. In the same year he was appointed United States Commissioner of Education, which position he held until June, 1906, winning wide fame by his masterly and helpful administration of the office. Doctor Harris is the author of numerous articles and works on philosophical and educational subjects and was the editor of the International Education Series.

**Harrisburg, PA.**, the capital of the state and the county-seat of Dauphin co., 105 mi. w. by n. of Philadelphia, on the Susquehanna River, on the Pennsylvania Canal and on the Philadelphia & Reading, the Pennsylvania, the Northern Central and other railroads. The city is picturesquely situated along the river, which is here a mile wide and spanned by five bridges. The most prominent building is the state capitol, designed and executed under the direction of Joseph M. Huston, and costing more than \$4,000,000. It covers a larger area than Saint Paul's at London. The frontage is 520 feet 8 inches, and there are three wings projecting to the rear. The dome is 241 feet from the grade line to the hall and has inscriptions from the writings of William Penn, the top being surmounted by a colossal figure 10 feet 6 inches in height. Subsidiary domes serve to light the corridors. The outside of the building is of granite from Hardwick, Vt. The marble work in the rotunda and corridors is American white from Vermont. The sculptural work was done by George Grey Barnard. The mural paintings in the governor's reception room were painted by Violet Oakley, while those in the dome, senate chamber, house of representatives and supreme court room were painted by Edwin A. Abbey. The bronze doors at the three main entrances are specimens of superior workmanship. At the main entrance is a large fountain, on



## Harrison

each side of which a wide stairway leads up to a circular portico, which serves as a reviewing stand. The dedicatory address was delivered by President Roosevelt on Oct. 4, 1906. In an adjoining building is the large state library and a valuable collection of various curiosities. The city has a large public library, a good high school, a conservatory of music, and various hospitals, churches and charitable organizations. Other prominent buildings are the governor's mansion, the state arsenal, the state hospital for the insane, the county prison, the Y. M. C. A. and a number of business blocks. The city has excellent transportation facilities and conducts a large trade in lumber and other goods. The iron and coal mines close at hand have led to the development of an extensive iron and steel industry. Harrisburg has one of the largest boot and shoe factories in the United States, a large silk mill, a carriage factory, engine works, electrical plants, breweries and other factories.

In 1726 the English trader John Harris settled there. A ferry was established later, and the place was known as Harris's Ferry, until a town was laid out in 1785 and called Harrisburg. In 1812 it was made the capital of the state, and it was chartered as a city in 1860. Population in 1910, 64,186.

**Harrison, N. J.**, a city in Hudson co., on the Passaic River and on the Pennsylvania, the Lackawanna and the Erie railroads. It is a suburb of Newark, which has a branch post-office here, but Harrison maintains an independent city government. The extensive industries include a large steel plant, engine works, machine shops, breweries and manufactories of trunks, refrigerators and other articles. The New Jersey soldiers' home is located here. The place was settled as early as 1668 and was incorporated in 1873. Population in 1910, 14,498.

**Harrison, BENJAMIN** (about 1740-1791), an American Revolutionary patriot and signer of the Declaration of Independence, born at Berkeley, Va. He was one of the conservative patriots and opposed Patrick Henry's early resolutions against the Stamp Act, but later he represented Virginia in the Continental Congress and rendered important service as president of the board of war. Returning to his state, he was speaker of the house of burgesses from 1777 to 1782, and for three years thereafter he was governor. He opposed the ratification of the Federal Constitution by Virginia.

**Harrison, BENJAMIN** (1833-1901), an American statesman, the twenty-third president of

## Harrison

the United States, born in North Bend, Ohio. He was the grandson of William Henry Harrison, ninth president of the United States, and the great-grandson of Benjamin Harrison, a signer of the Declaration of Independence. In 1852 he graduated from Miami University and went to Cincinnati, where he studied law. Two years later he removed to Indianapolis, Ind., where he built up a large law practice. When the war broke out, he entered the Union army as lieutenant, but was soon promoted to colonel and organized the Seventeenth Indiana Volunteers. He fought



BENJAMIN HARRISON

bravely in the Atlanta campaign and about Nashville, and at the close of the war he had won the rank of brigadier general.

He became supreme court reporter, but in 1868 returned to the practice of law. In 1876 he was nominated by the Republican party for governor of Indiana, but was defeated. He was elected United States senator in 1880, serving one term, and was a conspicuous advocate of civil service reform and of restriction of Chinese immigration. Harrison was nominated for president in 1888 by the Republican National Convention at Chicago and was elected by a good majority, receiving 233 electoral votes to 168 for President Cleveland, the Democratic nominee. Among the important measures adopted during his administration were the McKinley tariff bill, the suspension of the Louisiana lottery, the establishment of the reciprocity policy, the extension of the navy,



## Harrison

the settlement of troubles in Chile and Samoa and the Bering Sea fisheries arbitration. Mr. Harrison was nominated for a second term in 1892 by the Republicans, but was defeated by his predecessor, Grover Cleveland. He returned to Indianapolis and resumed the practice of law, but became a professor of international law at Leland Stanford University. He was counsel for Venezuela before the arbitration tribunal in 1899 and chief representative of the United States at the Hague Peace Conference.

**Harrison, CARTER HENRY** (1860- ), an American politician, born at Chicago, the son of Carter H. Harrison, who was five times mayor of Chicago. He was educated in the Chicago public schools and in Germany and graduated at Saint Ignatius College in Chicago in 1881 and from the Yale Law School two years later. He entered upon the practice of law, later engaged in the real estate business and for three years was publisher and editor of the *Chicago Times*. In 1897 he was elected mayor of the city and was reelected in 1899, 1901 and 1903 and again in 1911 as a Democrat.

**Harrison, CONSTANCE CARY** (1846- ), an American author, born in Virginia. She was married to Burton Harrison, a Virginia lawyer, the private secretary of Jefferson Davis. She contributed extensively to the periodicals and wrote many books. *Old Fashioned Fairy Book* and *Folk and Fairy Tales* are for younger readers. Of her plays, *The Unwelcome Mrs. Hatch* is probably the best known. She also wrote *Recollections, Grave and Gay*.

**Harrison, WILLIAM HENRY** (1773-1841), an American statesman and soldier, ninth president of the United States, born in Charles City County, Va., and educated at Hampden-Sidney College. His father, Benjamin Harrison, was one of the signers of the Declaration of Independence. After his father's death, Harrison joined the army which Wayne was leading against the Northwestern Indians and showed great gallantry at the battle on the Miami (1794). He represented the Northwest Territory as a delegate in Congress in 1799-1800 and succeeded in securing the passage of a valuable law relating to the sale of the Federal land in small parcels. When Indiana Territory was formed (1800), including the present states of Indiana, Illinois, Michigan and Wisconsin, besides parts of Minnesota and Ohio, he was appointed its governor, and acted with rare ability and courage until 1813. He labored courageously to win the friendship of the Indians,

## Harrison

but was compelled to quell Tecumseh's outbreak and to beat off a fierce and treacherous attack under Tecumseh's brother, The Prophet, ending in an important battle at Tippecanoe (November 7, 1811).

In the War of 1812 Harrison was appointed major general of Kentucky militia, then brigadier general in the regular army, with chief command in the Northwest. He repulsed the British force under Proctor, and by the victory of Perry on Lake Erie he was enabled to pursue the invaders into Canada, where, on October 5, 1813, he totally routed them in the Battle of the Thames. In 1816 he was elected to Congress



WILLIAM HENRY HARRISON

and in 1824 became a United States senator. In 1828 he went as ambassador to Colombia, but was recalled the following year and for twelve years was clerk of a county court in Ohio. He was nominated for the presidency in 1836 by Whig conventions in several states, but received only 73 electoral votes against Van Buren's 170; but four years later, the Whig party having been reunited, he was nominated as a compromise candidate and defeated Van Buren, obtaining 234 electoral votes to the latter's 60. The contest is noteworthy as having witnessed the introduction of enormous mass meetings and processions and picturesque emblems and banners. It is known as the "Hard Cider and Log Cabin" campaign. Harrison died a month after his inauguration, being succeeded by John Tyler.

## Harrow

**Harrow**, an implement used by farmers for pulverizing the soil on plowed ground. The common harrow is a wooden frame, square or triangular, into which iron teeth have been driven. As the harrow is dragged over the ground by horses, it breaks up the soil and prepares it for the seed. Grain sown by hand is covered by harrowing. The wheel harrow has revolving disks of steel, instead of teeth, and is used to pulverize the soil on newly broken ground.

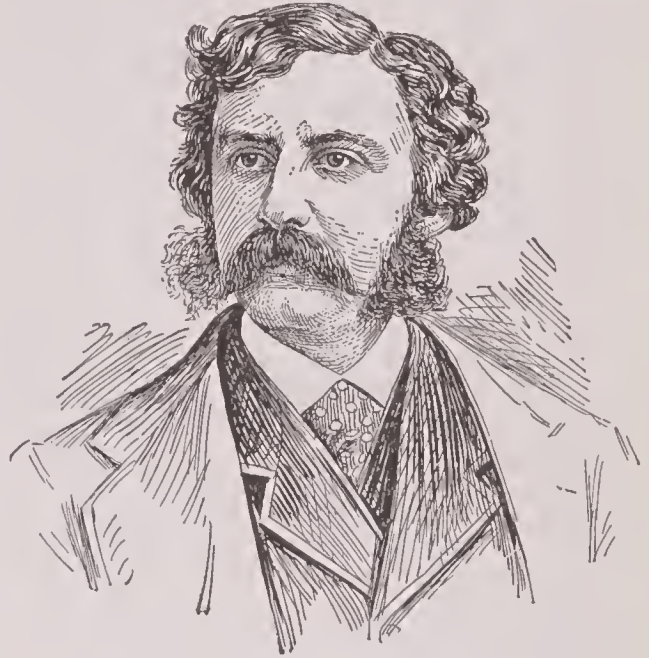
**Hart**, ALBERT BUSHNELL (1854- ), an American historian and teacher, born at Clarks-ville, Pa. He graduated at Harvard in 1880 and soon after became an instructor in the institution, later being made professor of history. He early engaged in literary work and published numerous works on the history and government of America, of which the most important are *Introduction to the Study of Federal Government*, *Essays on American Government*, *The Formation of the Union* (Epochs of American History Series), *Guide to the Study of American History* (with Edward Channing) and a biography of Salmon P. Chase (in the American Statesmen Series). He was also the editor of the Epochs of American History Series, of the *American History Told by Contemporaries*, the *Source-Book of American History* and of the *American Nation*, a history of the United States by associated scholars. He also became joint editor of the *American Historical Review* and of the *American History Leaflets*.

**Harte**, FRANCIS BRET (1839-1902), an American poet and short-story writer, born at Albany, N. Y. His father died while he was but a boy, and he went with his mother to California, where he made a scanty living by attempts at teaching, mining and printing. He became at length editor of the *Weekly Californian*, and in this paper appeared his *Condensed Novels*, parodies on the styles of various authors. Although these were very successful, it was not until the publication in the *Overland Monthly* of *The Luck of Roaring Camp* and *The Outcasts of Poker Flat* that he acquired national fame. A professorship in the University of California was given him, but he held it only a short time, returning to the East, where he made a contract to write only for the *Atlantic Monthly*. After serving as consul at Crefeld, Germany, and at Glasgow, he settled near London, where he lived until his death.

The two stories mentioned above, *The Luck of Roaring Camp* and *The Outcasts of Poker Flat*,

## Hartford

are Harte's most successful attempts in his most successful field. The picturesqueness of the phases of California society which he described might have made popular even less striking tales than these. Harte possessed the ability to tell a story vividly and tersely, allowing his characters



BRET HARTE

to reveal themselves in their own words and actions without unnecessary descriptions. Among the more famous of his other stories are *Tennessee's Partner*, *Two Men of Sandy Bar*, *The Twins of Table Mountain*, *The Three Partners* and *How Santa Claus Came to Simpson's Bar*. Of his humorous poetry the best known is *Plain Language from Truthful James*, which is perhaps more commonly referred to as *The Heathen Chinee*.

**Hartford**, CONN., the capital of the state and the county-seat of Hartford co., 124 mi. w. by s. of Boston and 110 mi. n. e. of New York City, on the Connecticut River and on the Central New England and several lines of the New York, New Haven & Hartford railroad. The city has a beautiful state capitol, constructed of white marble in a modern Gothic style, one of the finest capitol buildings in the country. Among notable monuments are the soldiers' memorial arch over the Park River, and the Corning Fountain. The Hartford Theological Seminary and Trinity College are located here, besides several other educational institutions. There are many large libraries and also a large number of charitable institutions. The city has several pretentious insurance buildings, including the Connecticut Mutual Life, the Aetna Life, the



## Hartford City

Phoenix Mutual Life, the National Fire and the Travelers', and it is for its insurance interests that Hartford is probably best known. Other prominent structures are the Saint Joseph Cathedral, the state arsenal and the Morgan Memorial building.

The position of the city, at the head of deep water navigation, has made it an important distributing center. Manufacturing was early developed, and the principal products are firearms, bicycles, automobiles, boilers, engines, rubber tires, electric goods, church organs, silverware, carriages and wagons, tobacco products, women's clothing, knit goods and typewriters. The *Courant* was started in 1764 and is now the oldest newspaper in the United States.

About 1633 the Dutch built a fort here, which they called "House of Hope." In 1637 some Puritan colonists made a settlement and called it Hartford. The freemen of Hartford, Windsor and Wethersford assembled here on January 14, 1639, and adopted the "Fundamental Orders of Connecticut," said to be the first written constitution ever drawn up in America. Hartford was the capital in 1701 and then shared that honor with New Haven, but since 1873 it has been the sole capital. Among the people who have been connected with Hartford are Noah Webster, John Fiske, Harriet Beecher Stowe, John Trumbull, Horace Bushnell, Charles Dudley Warner and Samuel Clemens (Mark Twain). Population in 1910, 98,915.

**Hartford City**, IND., the county-seat of Blackford co., 72 mi. n. e. of Indianapolis, on the Lake Erie & Western and the Pittsburg, Cincinnati, Chicago & Saint Louis railroads. The city is surrounded by an agricultural region and is supplied with natural gas. The manufactures include paper, glass, iron, flour and other articles. Population in 1910, 6187.

**Hartford Convention**, a famous assembly at Hartford, Conn., from December 15, 1814, to January 5, 1815. Massachusetts, Connecticut and Rhode Island were represented by delegates, while New Hampshire and other New England states were represented by proxy. It was the outgrowth of opposition of the Federalist party to the War of 1812 and to the conduct of the war by the Anti-Federalist, or Democratic, administration. The sessions of the convention were secret, and there were false rumors that it planned the secession of New England. Its real aim was to propose reforms in the government in the direction of greater independence for the

## Harvard University

states. It was one of the events which led to the final downfall of the Federalist party.

**Har'thacnut**. See HARDECANUTE.

**Harts'horn**, in pharmacy, the horn of the common stag, from which substances deemed of high medical value were formerly prepared by distillation, such as spirits of hartshorn, oil of hartshorn and salt of hartshorn. The active ingredient of these was ammonia, which is now obtained from gas liquor and other sources. See AMMONIA.

**Harun-al-Rashid**, *hah roon'al rah sheed'*, (?-809), a celebrated caliph of the Saracens. The popular fame of this caliph is evinced by the *Arabian Nights Entertainments*, in which Harun, his wife, Zobeide, his vizier, Giaffar, and his chief eunuch, Mesrour, are conspicuous characters.

**Harvard**, JOHN (1607-1638), an English clergyman, born in Southwark, London. He was educated at Emmanuel College, Cambridge, and came to America in 1637, settling at Charlestown, Mass. The following year he died and bequeathed his library of about 300 volumes and an estate of £400 to the college at New Towne, which had been established two years previous by order of the Massachusetts General Court. From this he is considered the principal founder of Harvard College, which was named for him and which has since grown to Harvard University.

**Harvard University**, the oldest and largest university in the United States. It was established at New Towne (now Cambridge, Mass.) in 1636 by order of the General Court of the Colony of Massachusetts Bay, and two years later was named Harvard College in honor of Rev. John Harvard, who, at his death, bequeathed the institution half his property (probably about \$2000) and his library of 300 volumes. The first class of nine members was graduated in 1642. In this year the college was placed under the management of a board of overseers and in 1650 it became a corporation under the name of the President and Fellows of Harvard College; the overseers and the corporation still remain the governing boards of the college. Previous to the Revolutionary War and for some time after, the institution was crippled by religious and political dissensions, and by lack of financial support. Since 1834 it has been entirely non-sectarian and has included in its board of overseers, corporation and faculties, members of all religious denominations. The present teaching force numbers over 600 and the enrollment of the university in all departments is about 5500. The

## Harvest Bug

value of its property, exclusive of books and collections, is \$28,000,000, which includes an endowment fund of over \$19,000,000. The annual income, exclusive of gifts and bequests, is about \$2,000,000.

The university maintains seventeen departments: (1) Harvard College; (2) the Lawrence Scientific School; (3) the Graduate School of Arts and Sciences; (4) the Graduate School of Applied Science; (5) the Divinity School, which is entirely non-sectarian; (6) the Law School; (7) the Medical School; (8) the Dental School; (9) the Bussey Institute, a scientific school of agriculture and horticulture; (10) the Arnold Arboretum, a site of 220 acres located in West Roxbury and devoted to forestry and arboriculture; (11) the University Library, which includes the general and the departmental libraries and numbers in all over 700,000 volumes and over 300,000 pamphlets; (12) the Museum of Comparative Zoölogy, founded by Professor Agassiz (See AGASSIZ, LOUIS); (13) the Peabody Museum of Archaeology and Ethnology; (14) the University Museum, which includes museums of botany, mineralogy, geology and art; (15) the Botanic Garden; (16) the Gray Herbarium, containing collections donated to the university by Professor Gray (See GRAY, ASA); and (17) the Astronomical Observatory, with its main station at Cambridge and a branch station near Arequipa, Peru. A summer school is maintained by the University for the instruction of teachers and others who wish to take special work in literature, science, theology or medicine. Radcliffe College, which is affiliated with Harvard, provides for the education of women (See RADCLIFFE COLLEGE).

The University publishes a large number of scientific and literary periodicals. The most popular of these are the *Harvard Historical Studies*, *Quarterly Journal of Economics*, *Harvard Law Review*, the *Harvard Graduates' Magazine* and the *Harvard University Gazette*.

**Harvest Bug**, a mite, of a bright red color, so small as scarcely to be visible, resembling a grain of cayenne pepper. It appears in June or July and burrows under the skin of such domestic animals as horses, dogs and sheep. Its attacks are also very annoying to human beings.

**Harvest Man.** See DADDY-LONG-LEGS.

**Harvest Moon**, a name which calls attention to a peculiarity in the apparent motion of the full moon, by which, in the United States and high latitudes generally, it rises about the same time in the harvest season (or about the autumnal

## Hasdrubal

equinox in September) for several successive evenings. In the southern latitudes this phenomenon occurs in March. It is owing to the fact that the moon is then traveling in that part of her orbit at which it makes the least possible angle with the ecliptic.

**Harvey**, ILL., a city in Cook co., 20 mi. s. of the Chicago courthouse, on the Illinois Central, the Grand Trunk, the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. It is a residence suburb of Chicago and has manufacturing of automobiles, stoves, railroad supplies and various machinery. Population in 1910, 7227.

**Harvey**, WILLIAM (1578-1657), an English physician, the discoverer of the true theory of the circulation of the blood. He entered Caius College, Cambridge, in 1593, and about 1599 he proceeded to Padua, then the most celebrated school of medicine in Europe. He took the degree of M. D. and returned to England in 1602. He settled in London, was admitted as a fellow of the College of Physicians, was elected physician of Saint Bartholomew's Hospital and in 1615 was chosen Lumleian lecturer. His views on the circulation of the blood were formally given to the world in his *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* (On the Movement of the Heart and Blood in Animals), published at Amsterdam in 1628. In 1623 he was appointed physician extraordinary to James I, and in 1632 he became the physician of Charles I. He was present at the Battle of Edgehill and afterward accompanied Charles to Oxford. Here he was elected master of Merton College, an office which he lost on the surrender of Oxford to the Parliament. He returned to London in 1646 and spent the remainder of his life in retirement.

**Harz**, *hahrts*, the most northerly mountain chain of Germany, from which an extensive plain stretches to the North Sea and the Baltic. It comprises an extent of about 60 miles in length and nearly 20 in breadth, embracing the towns of Klausthal, Goslar, Blankenburg and Wernigerode. The Brocken, its highest summit, is 3742 feet high. That part of the Harz which includes the Brocken, with the neighboring high summits, is called the Upper Harz and consists entirely of granite. The southeastern portion is called the Lower Harz. The Harz abounds in woods and fine pastures and is rich in minerals, including silver, iron, copper, manganese, granite, porphyry, slate and marble.

**Hasdrubal**, the name of several Carthaginian leaders. Chief of these were the son-in-law and



## Hashish

the son of Hamilcar Barca. HASDRUBAL, the son-in-law of Hamilcar, succeeded the latter in command of the army in Spain in 228 B. C. He completed the subjugation of Spain, which Hamilcar had begun, and founded New Carthage. In 221 B.C. he was assassinated. HASDRUBAL, the son of Hamilcar and the brother of Hannibal, on the departure of Hannibal for Italy in 218 B.C., was left in command of the army in Spain, and carried on a long series of military operations against the Roman troops, which were commanded by the two Scipios. His brother Hannibal requiring his assistance in Italy, Hasdrubal led an army from Spain into that country (207 B. C.), but before he could join forces with his brother he was defeated on the right bank of the Metaurus. It is said that the Roman commander had Hasdrubal's head thrown into Hannibal's camp, by way of announcing the defeat and death of his brother.

**Hashish**, *hash'eesh*, an intoxicating narcotic, made in Eastern countries from an indian hemp, which is also called hashish. It produces a kind of intoxication, accompanied with ecstasies and hallucinations, ending in stupor and sleep.

**Hastings**, NEB., county-seat of Adams co., 96 mi. w. of Lincoln, on the Burlington, the Missouri Pacific, St. Joseph & Grand Island and Northwestern railways. It is in the center of a fertile wheat belt and stockraising region, and manufactures agricultural implements, flour, brick, cement, and has a large foundry, marble works and canning factories. It is the seat of Hastings College, Immaculate Conception Academy, Adventist Sanitarium and an insane asylum. Population in 1910, 9338.

**Hastings**, BATTLE OF, the name given to the battle fought at Senlac, near Hastings, in 1066, between Harold II and William, duke of Normandy. Harold, William asserted, had promised to support his claim to the throne, and when Harold allowed himself to be crowned king, William invaded England to assert his rights. The battle took place on August 14. The English were defeated, Harold himself was killed and England was brought under the rule of the Normans. This is regarded as one of the fifteen decisive battles of the world.

**Hastings**, WARREN (1732-1818), an English statesman, first governor-general of India. He was educated at Westminster School and in 1750 was sent to Bengal, as a writer in the service of the East India Company. He won distinction in Clive's campaign in 1757. In 1761 he removed to Calcutta, having obtained a seat in the Bengal

## Hat

council, but he returned to England in 1764. Returning to India five years later, he became a member of the council at Madras, and three years later he was made president of the supreme council of Bengal. In 1774 he was made governor-general of India, and although his administration was most able, he was sometimes obliged to resort to questionable means for securing the large sums of money which the East India Company constantly demanded. After eleven years spent as governor-general, he resigned his office and sailed for England, leaving his empire in a most prosperous state. Shortly after his arrival in England, he was impeached by Burke and was charged with acts of injustice and aggression, with maladministration and the receiving of bribes. This celebrated trial, in which Burke, Fox, Sheridan and Grey were arrayed against him, began in 1788 and terminated in 1795 with the acquittal of Hastings. The East India Company in 1796 settled on him a large annuity, and he passed the remainder of his life in retirement at Daylesford, which he purchased.

**Hat**, a covering for the head. Hats are usually made of straw, silk or felt and are worn for protection or ornament. While the hat was known to the Greeks and Romans, yet as an article of dress it is of comparatively recent origin. It was never generally worn until in the fourteenth century, when the manufacture of felt hats was begun in Germany and France. Hats were introduced into England in the seventeenth century, where they replaced caps and bonnets, and the soft felt hat was introduced into America about the middle of the nineteenth century by the Hungarian patriot, Kossuth.

Felt hats are made of the hair of rabbits and hares, with a proportion of beaver's fur. The felt is manufactured over cone-shaped molds and is then stretched over a wooden block of the size and shape of the hat. The hat is then dyed and again pressed on a block, after which the surface is smoothed and finished and the sweat band, lining and other attachments are added. Straw hats are made by plaiting straw. The finest work of this sort is done in Italy, China, Japan and some of the countries of South America. There are two methods, one of plaiting the straw into braids, which are then sewed together to form the hat, and the other of weaving the straw into a fabric, which is pressed into the shape of the hats. The higher-priced hats, such as the leghorns and Panamas, are made on the latter plan. A silk hat usually has a tall, cylinder-

## Hatton

shaped crown and a narrow, curled brim. The crown is made of a stiff board, covered with a glossy silk plush.

Styles in hats are constantly changing, as can readily be seen by comparing the pictures of costumes of different periods from the time of the Puritans to the present day. The Puritans wore a steeple-crowned hat. This was succeeded by the cocked hat common in Europe and America during the eighteenth century. This was followed by the felt hat.

**Hatton**, JOSEPH (1841–1907), an English journalist, novelist and playwright. His first work was done for the *Derbyshire Times*, and in 1868 he became editor of the *Gentlemen's Magazine*. As correspondent for American papers he made several visits to the United States. He first became widely popular through his *Cigarette Papers*, which appeared in the *People*, but his reputation rests largely on his novels, among which are *The Dagger and the Cross*, *When Rogues Fall Out* and *In Male Attire*. He also dramatized several novels, among them *The Scarlet Letter*, produced by Richard Mansfield.

**Hauptmann**, *howpt'man*, GERHART (1862–), a distinguished German dramatist. His dramas and poems are powerful and intense and depict in a marvelously natural manner the actions and struggles of people in everyday life. His earlier plays, best known among which is *Before Sunrise*, are almost morbid in their close attention to the unpleasant side of life, but his later plays are distinguished rather by idealism and mysticism. Among these later plays *The Sunken Bell* is most famous. He was awarded the Nobel prize for literature in 1912.

**Hausmann**, *ose mahN'*, GEORGES EUGENE, Baron (1809–1871), a French official during the Second Empire. He entered public service under Louis Philippe and distinguished himself in various departments of France, but his great work did not begin until his appointment under Louis Napoleon to the position of prefect of the Seine. While in this office he greatly improved Paris by widening streets, laying out parks and boulevards and erecting great public buildings, statues and bridges. Although his work did much toward making the Second Empire popular, he had many enemies, and his downfall was brought about in 1870. He served after this time, however, in the Chamber of Deputies.

**Hautboy**, *ho'boy*. See OBOE.

**Havana**, *ha vah'na* (Spanish, *La Habana*, "the haven"), an important maritime city of Cuba, capital of the Republic, is situated on the

## Havelock

n. w. coast of the island, on an extensive and excellent natural harbor. It has an area of about nine square miles, of which about half is in the old portion of the city and is covered with buildings of quaint designs, ranged along narrow and irregular streets. However, many of the buildings, even of this quarter, are beautiful in their architecture, including the governor's palace and the cathedral, built in 1724. The city has numerous fine parks and boulevards, especially



the Prado, running outside of the city wall and terminating in Colon Park, the most beautiful in the city; the Calle de la Reina, and the Alameda de Paula. Havana formerly was famous for its unsanitary condition and its dirty, unseemly appearance, but these conditions have been much improved under the direction of Americans. The city is the chief port of the island and handles a large part of its commerce. Its own exports consist chiefly of cigars, tobacco and sugar, while it imports food and cotton. It is connected by steamship with the United States, Spain, England and France. The United States has the principal share of the trade, and Spain and England rank next. The town was founded in 1511, but was only fairly begun in 1519. Though suffering many times from depredations by Spain's enemies and by pirates, it soon became the leading Spanish station in America. The United States warship *Maine* was destroyed in the harbor, February 15, 1898. Population in 1911, 319,884.

**Hav'eiock**, HENRY, Sir (1795–1857), a British soldier. He went to India shortly after entering the army and served with distinction in the Afghan and Sikh wars. On the outbreak of the Indian mutiny, he was dispatched to Allahabad, in order to support Lawrence at Lucknow and



## Haverhill

Wheeler at Cawnpore. On arriving at Cawnpore he found that Nana Sahib had massacred the prisoners. Pursuing his march to Lucknow, he defeated the rebels in various struggles and, finally, with the aid of Outram, won the Battle of Alam Bagh. Having captured Lucknow, Havelock and Outram were shut up there until relieved by Sir Colin Campbell in November, 1857. Havelock died shortly after the relief. He was raised to the rank of major general and was made a baronet and a Knight Commander of the Bath before the word of his death reached England.

**Hav'erhill**, MASS., a city in Essex co., 33 mi. n. of Boston, on the Merrimac River and on the Boston & Maine railroad. It is an important industrial center, being one of the leading towns in the production of boots and shoes. It has also extensive manufactories of leather, shoes, machinery and supplies, hats, woolens, brick and lumber. The principal buildings include the city hall, the public library, the Masonic temple, the Hale Hospital and the Bradford Academy. The first settlement was made in 1640, on the site of the old indian town Pentucket, and during the early days the town was often attacked by indians. In 1782 the city suffered from a disastrous fire. Population in 1910, 44,115.

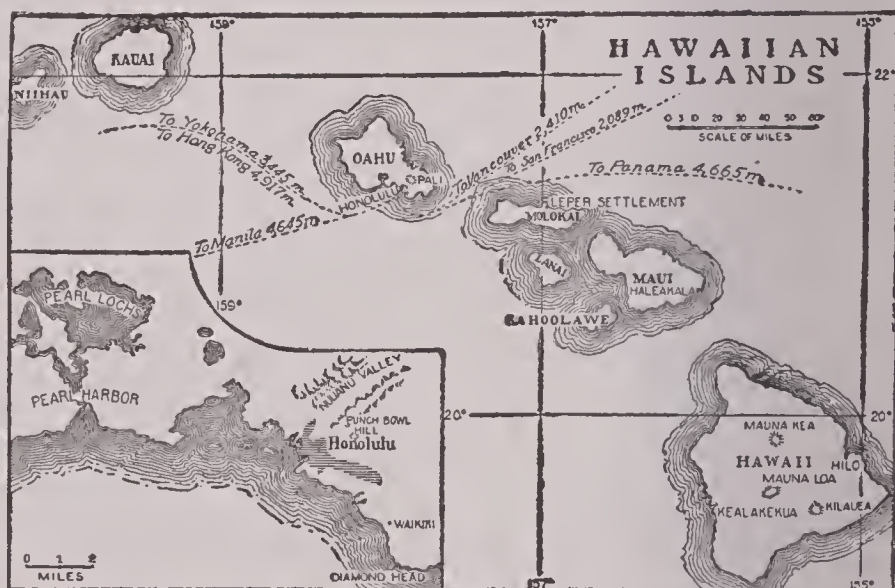
**Hav'erstraw**, N. Y., a village of Rockland co., on the west bank of the Hudson River, 32 mi. n. of New York, on the New Jersey & New York and the West Shore railroads. Steamers carry on an active trade with New York, and there are several foundries and manufactories. The manufacture of brick is extensive. Haverstraw was settled by the Dutch and was incorporated as a town in 1854. Population in 1910, 5669.

**Havre**, *ah'vr'*, (formerly Le Havre-de-Grâce), a seaport of northern France, in the Department of Seine-Inferieure, on the north side of the estuary of the Seine, 108 mi. n. w. of Paris. Among the chief buildings are the Church of Notre Dame, the exchange, an arsenal, the city hall, a museum and several theaters. The fortifications are extensive and make Havre a fortress of first rank. The manufactures include chemicals, machinery, cotton

## Hawaii

goods, earthen and stone ware, paper, glass, oil, refined sugar and ropes. A government tobacco factory employs 300 workmen. The chief dependence of Havre is on its commerce, which is the greatest of all French ports, except Marscilles. It has a large trade with England and Germany and, especially, with the United States, importing large quantities of cotton and other produce. Population in 1911, 136,159.

**Hawaii**, *hah wi'e*, or **Hawaiian**, *hah wi'an*, **Islands**, formerly Sandwich Islands, a group of islands in the Pacific Ocean, belonging to the United States. They are situated between latitudes 18° 54' and 22° 15' north and between longitudes 154° 50' and 160° 30' west, about 2200 miles s. w. of San Francisco. There are eight inhabited islands and several smaller ones which are uninhabited, the whole group



covering an area of 6740 square miles. The most important islands are Hawaii, Maui, Oahu, Kauai, Molokai, Lanai, Kahoolawe and Niihau.

**SURFACE AND DRAINAGE.** The islands are of volcanic origin, with coral reefs partly lining most of them, but entirely encircling none. They are mountainous; but only Hawaii is actively volcanic. This island has two of the largest craters in the world, Mauna Kea and Mauna Loa, which are 13,805 and 13,675 feet high, respectively (See MAUNA KEA; MAUNA LOA). On the eastern slope of Mauna Loa is the far-famed Kilauea, the largest active volcano in the world (See KILAUEA). The island is also traversed by other mountains, which give it a rugged and picturesque appearance, and in places bold cliffs from 1000 to 3000 feet high front the sea. The coasts, especially of Kauai, are indented with deep bays and

## Hawaiian Islands

**inlets.** Between the mountains and the coast extend fertile plains and valleys, where agriculture is extensively carried on. The rivers of Hawaii are mostly small mountain torrents and are found in the north and the east of the island.

**CLIMATE.** The climate is moderate. It is never too warm and never cold. The average temperatures of the lowlands are 70° in January and 78° in July. The mean temperature is about 10° cooler than that of other countries in the same latitude. Only two seasons are recognized, and in the winter the greatest rainfall occurs. Thunderstorms are rare, but very severe, and hurricanes are unknown. The climate is on the whole very healthful.

**INDUSTRIES.** Agriculture is the principal industry. The soils vary in different parts of the island. In the highlands they are poor and thin, but in the lowlands they are rich and very productive. Sugar is grown in the low plains; higher up are found coffee, fruits and vegetables and pasture lands. Sugar is the staple product and is grown very extensively. Over half of the population is engaged in this industry, and the scarcity of labor has necessitated the importation of foreign laborers, especially from Japan and China. Next in importance to sugar comes rice, which is grown in the lowest flats and is cultivated mostly by the Chinese. Coffee is not grown extensively yet, but the prospects for its cultivation are very favorable. Fruits, vegetables and cereals are also grown to some extent. Among the characteristic trees found in the islands are the *koa*, the candle-nut tree and the *ohia* (mountain apple), and these are found especially in Maui. The manufactures are not important, the manufacture of sugar being the only branch of this industry which is worthy of mention. The exports are exclusively sugar, and the imports include machinery and other manufactured products. The trade is mostly carried on with the United States and has developed greatly within recent years.

**TRANSPORTATION.** The position of the islands is favorable for communication with most parts of the world. The territory is on the line of vessels trading between ports of western North America on the one side and eastern Asia on the other, and its position is responsible for its commercial development. Regular steamers come to Honolulu from San Francisco, Vancouver, Yokohama, Hong Kong and different points in Australia. In the islands good roads have been constructed, and there are some

## Hawaiian Islands

railroads. Honolulu is a station of the American Pacific Cable and has direct communication with the United States and the Orient.

**INHABITANTS.** The population of Hawaii is exceedingly mixed. The native population was estimated by Cook in 1778 at 400,000, but it has rapidly decreased, the census of 1900 showing only 29,834. The total population at present includes Japanese, Caucasians and Chinese. The Caucasians consist mostly of Portuguese. In 1900 the total population was 154,000, including 61,111 Japanese, 28,533 Caucasians and 25,767 Chinese. In 1910 it was 191,909.

**EDUCATION.** In 1820 the earliest missionaries established schools. Four years later 2000 people had learned to read and a general public school system had been extended over the islands. A seminary for the training of teachers was established in 1831. Two years later the Oahu Charity High School, which is now the Honolulu High School, was established, and in 1836 a boarding school for boys, and three years later an industrial school, followed. The Royal School for chiefs, founded in 1840, now a school for all Hawaiian boys, was the chief school for the teaching of English. Various other mission schools have sprung up from time to time, and in 1839 the Roman Catholic missionaries established schools. In all schools the English language is used as a basis of instruction. Attendance is compulsory for the whole year for children between six and fifteen, and the schools are free. A minister of public instruction has charge of the schools, and he is aided by six commissioners.

**GOVERNMENT AND RELIGION.** In 1900 Hawaii became a territory of the United States. The form of government is similar to that of the other organized territories of the United States (See TERRITORY). The religion of such a population is naturally varied. The early missionaries succeeded in introducing Christianity into the islands. However, the Chinese and Japanese, who are in great numbers, generally hold to their Oriental religion. More than half of the islanders are Protestants. The Portuguese are mostly Catholics.

**CITIES.** The chief cities in order of size are Honolulu, one of the most excellent ports of the Pacific; and Hilo, in the island Hawaii. See separate articles on these cities.

**HISTORY.** The islands are said to have been discovered by Gaetano in 1542 and rediscovered in 1778 by Captain Cook, who met his death at the hands of the natives in the following



## Hawaiian Islands

year. In early times each island had a king, but under Kamehameha I the islands were formed into one kingdom. Kamehameha died in 1819 and was succeeded by his son, Liholiho, who adopted on his accession the name of Kamehameha II, and whose reign was famous for the abolition of idolatry and the system of taboo throughout all the islands (See TABOO). Vancouver, who arrived with Cook in 1778 and returned in 1792 and again in 1794, made sincere attempts to enlighten the islanders, and he succeeded so far that he was requested by the king and his chiefs to send religious teachers to them from England. The first missionaries, however, who visited the islands came from America in 1820. The missionaries were well received, and the work of instruction was at once begun, as the king saw the necessity of introducing a new religion to take the place of the one which he had abolished. Kamehameha II and his queen visited England and both died in London in 1824.

Until the year 1840 the government of the islands was a simple despotism, but in that year Kamehameha III granted a constitution, which provided for a government consisting of a king, an assembly of nobles and a representative council. In 1843 the independence of the Hawaiian kingdom was formally guaranteed by the French and English governments. Kamehameha IV (1854-1863) was succeeded by his brother, Kamehameha V. With his death in 1873 the line of Kamehamehas became extinct, and the high chief Lunalilo was elected to the vacant throne. On his death in 1874 another high chief, Kalakaua, was elected king. This ruler died in 1891 and was succeeded by his sister, Liliuokalani. She had shown during the previous reign her reactionary tendencies, and after her accession it became clear that she intended to rule without a constitution. A revolution therefore broke out, headed by the progressive party of the state, and the queen was deposed. A provisional government was then formed, and overtures were made for annexation to the United States. As these were not favorably received, the Republic of Hawaii was proclaimed July 4, 1894, with a constitution modeled after that of the United States.

Repeated efforts were made to annex the islands, and in 1898 Sanford B. Dole, president of Hawaii, visited Washington in the interest of annexation. A joint resolution of Congress was passed and signed by President McKinley

## Hawk Moth

in July, 1898, in accordance with which the President appointed a commission to visit the islands and draw up a plan of government. The United States took formal possession of the islands in August, 1898. The act of Congress approved in April, 1900, made provision for a territorial government, and under this act Dole, formerly president of the Republic, took the oath of office as governor in June, 1900.

**Hawk**, a name given to many birds of prey, though especially to those having shorter wings than the falcons and much resembling them in habits. In the United States it is the common name for all the quick-winged species, varying in size from the large chicken hawk to the little sparrow hawk. See FALCON; FISH HAWK; KITE; SPARROW HAWK.

**Hawkins**, ANTHONY HOPE (1863- ), an English novelist. He graduated from Balliol College, Oxford, studied law and was admitted to the bar. His literary career began with a book entitled *A Man of Mark*, published under the name of Anthony Hope. Later he published *Father Stafford*, *Mr. Witt's Widow*, *Sport Royal*, the exceedingly popular *Prisoner of Zenda* and its sequel, *Rupert of Hentzau*, *Phroso*, *The Heart of Princess Osra*, *Dolly Dialogues* and *Double Harness*. His work is marked by a vigorous, animated style and by a keen insight into the workings of the human mind.

**Hawkins** or **Hawkyns**, JOHN, Sir (1532-1595), an English naval commander and explorer. In 1562 he made his first expedition to Africa, where he captured three hundred negroes, whom he carried to the West Indies. He compelled the West Indian traders to accept the negroes in return for other goods. Two other such expeditions were successfully carried out, but on the return from the last one he came into conflict with a Spanish fleet, was utterly defeated and escaped on a small ship. On his return to England he was elected to Parliament and given the office of treasurer and comptroller of the royal navy. The strength and efficiency of the navy were greatly increased under him, but he was accused of dishonesty in his management. As a reward for his bravery and ability in the struggle with the Spanish Armada in 1588, he was knighted.

**Hawk Moth**, a stout moth, with narrow wings, often seen flying about flowers, where it is often mistaken for a humming bird. Some species are very beautiful in color. See SPHINX MOTH.



## Hawksbill

**Hawks'bill**, a large turtle found in warm seas. It has a peculiar-shaped tail which serves as a weapon of defense. From this turtle, which is also called loggerhead and caret, is taken the tortoise shell, an important article of commerce. See TORTOISE.

**Hawley**, JOSEPH ROSWELL (1826–1905), an American statesman, born in Stewartsville, N. C. He was taken at the age of eleven to Connecticut, was educated at Hamilton College, N. Y., and after studying law began practice at Hartford, Conn., in 1850. As a Free-Soil Democrat, he was editor of its organ, *The Charter Oak*, but later supported the new Republican party and became editor of its chief Connecticut organ, *The Evening Press*. At the opening of the Civil War he enlisted as captain of a Connecticut company and was promoted, for gallant service at Bull Run, in Florida and in Grant's Virginia campaign, to be brigadier general of volunteers. He was mustered out of the service in January 1866, with the brevet rank of major general. Returning to Connecticut, he was elected governor, but served only one term, reëntering the field of journalism. In 1872 he was elected to Congress and again in 1878. At the end of this term he was elected to the United States Senate, and was three times reëlected, serving until his death. He was president of the Centennial Committee from its inception to the completion of its work, and he was a prominent candidate for the Republican presidential nomination in 1884.

**Haw'thorn**, a thorny shrub or small tree of the rose family, found wild in many parts of Europe, in north Africa and western Asia. The real hawthorn has been introduced in the United States, but it is not generally known in America. It is in general use in England as a hedge and is cultivated for the white and rose-colored blossoms, which make the country landscape very beautiful. The tree bears a small red fruit, called a *haw*, which affords a winter food for birds. The American thorn apple belongs to the same genus as the true hawthorn.

**Hawthorne**, JULIAN (1846– ), an American author, son of Nathaniel Hawthorne, born in Boston. He studied civil engineering in America and in Germany, but practiced that profession only a short time. He spent about ten years abroad, and while in Europe wrote *Bressant* and several other successful stories. Of the novels written after his return to America, *The Professor's Sister* and *John Parmlee's Curse* are noteworthy. His stories do not follow

## Hawthorne

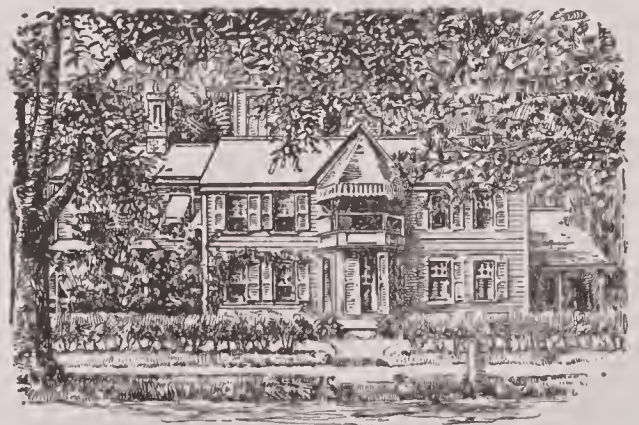
the common form of romance and have interesting touches of mystery about them. He has also written a *History of the United States* and has contributed to the newspapers articles on the 1897 famine in India and on the Cuban War.

**Hawthorne**, NATHANIEL (1804–1864), the foremost of American writers of fiction, was born at Salem, Mass., July 4, 1804. His childhood,



NATHANIEL HAWTHORNE

passed with his mother at his father's home in Salem, was singularly free from the restraints of formal schooling. Spenser's *Faerie Queene*, Bunyan's *Pilgrim's Progress*, the works of Shakespeare and of Milton and the quiet



"THE WAYSIDE," HAWTHORNE'S HOME AT CONCORD

natural scenes in which he loved to take solitary rambles were largely his teachers. When he was fourteen, his mother went with him to an



uncle's at Lake Sebago, Maine, and here his desire for solitude was still further developed. He spent much time wandering about in the unbroken forests or skating on the lake. In 1821 he entered Bowdoin College, where Longfellow and Franklin Pierce were his fellow-students, and from which he graduated in 1825 without having distinguished himself as a scholar. The succeeding twelve years were passed in almost complete seclusion at Salem. He wrote much, but destroyed almost all that he wrote, because it did not satisfy his own critical judgment. Various articles were written for periodicals, but they attracted little interest, and although the reprinting in 1837 of some of these, as *Twice-Told Tales*, won him praise, it did little toward helping him to maintain himself. Therefore in 1839 he accepted the position of weigher and gauger in the Boston customhouse, which he held for two years.

After a year spent at Brook Farm in what was to him largely an uncongenial experiment, he married Miss Peabody of Salem and moved to Concord, to the house which he celebrated in his *Mosses from an Old Manse*. The four years spent in Concord were happy years, although the tales which he published in periodicals and the *Mosses from an Old Manse* afforded him but a scanty living. He was surveyor of the customhouse at Salem from 1846 until 1849, when a change of political parties removed him from office. Immediately on leaving the customhouse he published *The Scarlet Letter*, which made him famous on both sides of the Atlantic. Following this came *The House of the Seven Gables* (1851) and the *Blithedale Romance*, the latter a thinly disguised account of his experiences at Brook Farm.

The election of his life-long friend, Franklin Pierce, to the presidency in 1853 brought Hawthorne an appointment to the consulship at Liverpool. After his term of office had expired, he spent a year and a half in Rome and Florence, and the record of his European years was given in the *English Notebooks* and *French and Italian Notebooks*. The greatest result of this period, however, was *The Marble Faun*, published in 1860. On his return to America he brought out *Our Old Home*, which gives further impressions of England and which was by no means favorably received in England. The *Dolliver Romance*, begun in 1864, was never finished, for the failing health of the author compelled him to abandon his work and seek to recover his strength in a tour with ex-President

Pierce, during which he died suddenly at Plymouth, N. H.

Hawthorne's was a rare personality, uniting in an unusual degree strength of intellect and will with an almost feminine refinement and sensibility. He was an optimist at heart, although frequently adjudged a pessimist, because he made the gloomier aspects of life so commonly his theme. Descended from pure New England stock, his genius was a genuine American product and gave to the traditions and tendencies of the Puritan life their most fitting expression. His style is remarkable for its clearness, ease and beauty.

Julian Hawthorne has written *Nathaniel Hawthorne and His Wife*, a biography of his father. See READING, Volume V.

**Hay**, in the ordinary use of the term, grass cured for fodder, but in its broadest sense, hay may mean grass or various grains which have been cured for this purpose. The plants ordinarily cultivated for hay are timothy and various sorts of clover and alfalfa. Sometimes rye, oats and barley are used for a similar purpose. Native hay is made from grasses that grow wild on the great plains in the United States and in some other localities. Among these are buffalo grass and what is sometimes known as prairie grass. Cultivated grasses are usually cut before they are quite ripe and allowed to dry by lying on the ground as they are cut. However, in localities where dew is heavy or rain is liable to fall, the hay is raked together at the close of the day and bunched. If not sufficiently dry for stacking, it is spread out the next day and allowed to remain until it is dry enough to stack. Nearly all of the work in cutting and curing hay is now done by machinery (See MOWING MACHINE; RAKE). In some parts of the United States, as in New England and New York, where farms are small, the hay is stacked in barns, but in most regions it is stacked out of doors. The hay is usually bound in place by tying poles over the stacks. The top of the stack is either conical or gable-shaped, with a steep slope, so that the water readily runs off and only a small portion of the hay on the outside is affected by the weather.

**Hay**, JOHN (1838-1905), an American diplomatist and writer, born at Salem, Ind. He graduated from Brown University in 1858, studied law and was admitted to the bar at Springfield, Ill., in 1861. The same year he left Illinois to become assistant secretary to President Lincoln, and subsequently he became his

## Hayden

adjutant and aid-de-camp, positions which bore fruit in the *Life of Abraham Lincoln*, written by him in conjunction with Nicolay and considered the greatest biography of Lincoln extant. He took an active part in the Civil War, rising to the rank of colonel and assistant adjutant general. From 1865 to 1870 he was secretary of a number of foreign legations. In 1870 he returned to the United States and entered newspaper work as one of the editors of the *New York Tribune*. In 1879 he was appointed assistant secretary of state. He was appointed by President McKinley ambassador to Great Britain in 1897, and in the following year he became secretary of state, succeeding William R. Day. In 1901 he negotiated the Hay-Pauncefote Treaty, concerning the Isthmian Canal, and was prominent in the settlement of international affairs in China in the same year. He remained secretary until his death, winning a high reputation as the exponent of a frank and fair diplomacy. He was also well known as an author, among his works being several volumes of poems, essays and criticisms, notably, *Pike County Ballads*, *Castilian Days* and *Sir Walter Scott: An Address*.

**Hayden**, FERDINAND VANDEVEER (1829-1887), an American geologist and explorer, born in Westfield, Mass., and educated at Oberlin College and at a medical school in Albany, N. Y. Before the Civil War Hayden was engaged in exploring and surveying the Great Plains and the Rocky Mountains, but in 1861 he was made a surgeon of volunteers. After the war he resumed his work, and in 1867 he was sent by the United States government to make a geological survey of the territory of Nebraska. This organization later became the Geological and Geographical Survey of the Territories and in 1879 was formed into the United States Geological Survey. Much of this work was due to Doctor Hayden, who realized the resources and possibilities of the West and did much by his writings to make these known to the people.

**Haydn**, *hi'd'n*, JOSEPH (1732-1809), a celebrated musical composer, born at Rohrau, Austria. At an early age, on account of the excellence of his voice, he was appointed a choir boy at Saint Stephen's Church, Vienna. At sixteen his voice began to break and he lost his position as a chorister. Having made the acquaintance of eminent musicians, including Gluck, Haydn gradually attracted public attention and obtained many pupils. From 1761 to 1790 he was musical director to Prince Esterhazy and composed during this period a great number

## Hayes

of works, including some 120 symphonies for orchestra and 12 operas. In 1791 and 1794 he visited England, where he remained nearly three years and wrote his opera *Orpheus and Eurydice*. In 1798 he published his oratorio of the *Creation*, and in 1800 that of the *Seasons*. Haydn's chief merit consists in his development of instrumental composition. He practically originated the symphony and stringed quartette.

**Haydon**, BENJAMIN ROBERT (1786-1846), an English painter, born at Plymouth. He studied at Plymouth and in London and soon displayed remarkable ability as a painter of historical subjects. A quarrel with influential members of the academy prevented him from receiving the recognition that his paintings deserved. Most of his life was spent in poverty. Among his famous paintings are *Christ's Entry into Jerusalem*, *Lazarus*, *Christ Blessing Little Children* and *Nero Playing the Lyre during the Burning of Rome*.

**Hayes**, *haze*, ISAAC ISRAEL (1832-1881), an American Arctic explorer, born in Chester County, Pa. He was a member of the expedition of 1853-1855 under Doctor Kane, and he himself commanded an expedition in 1860-1861, in order to prove the existence of an open polar sea. He served as an army surgeon during the war, and in 1869 he visited Greenland. He wrote *The Open Polar Sea* and *The Land of Desolation*. See NORTH POLAR EXPLORATION.

**Hayes**, RUTHERFORD BIRCHARD (1822-1893), an American statesman, nineteenth president of the United States. He was born in Delaware, Ohio, and was educated at Kenyon College, graduating at the head of his class in 1842. He studied law at Harvard and practiced at Marietta, Fremont and Cincinnati, Ohio. At the outbreak of the Civil War, he was made major of volunteers. His conduct on the field was marked by conspicuous gallantry, and he attained by meritorious service the rank of brevet major general, his most famous exploits being at the Battle of South Mountain, near Antietam; the capture of Morgan after his raid into Ohio, and in the Shenandoah campaign of Sheridan.

In 1865 he was elected a Republican member of Congress, where he won a reputation for honest and efficient hard work. In 1867, 1869 and 1875 he was elected governor of Ohio, and in 1876 was nominated for the presidency. An electoral commission, appointed by Congress, was required to decide the result of the election, which declared in favor of Mr. Hayes over Samuel J. Tilden, the Democratic nominee (See ELECTORAL COMMISS-



## Hay Fever

SION). His administration was conciliatory toward the South, earnest in its efforts for the reform of the civil service and firmly opposed to questionable plans of national finance. After his



RUTHERFORD B. HAYES

retirement from the presidency his life was devoted to philanthropy, to efforts for the improvement of educational facilities in the South and to prison reform.

**Hay Fever** or **Hay Asthma**, a complaint that appears like a severe cold, in which there are profuse discharges from the nose, accompanied by sneezing, weeping eyes and a general feeling of lassitude and illness. Persons suffering from hay fever have annual attacks, occurring with great regularity at some time during the summer months. The majority of cases begin at some time in August and last till cold weather. The disease appears to attack persons in a weakened nervous condition and to be caused primarily by the pollen from plants or irritating dust from stables and other places. Medicines do not cure hay fever, but often a change of climate will give immediate relief.

**Hayne**, ROBERT YOUNG (1791-1839), an American politician, born in Colleton District, S. C. He was admitted to the bar in 1812 and soon attained prominence. He served in the War of 1812, at its close was elected to the legislature and in 1818 became attorney-general of his state. As a conspicuous states' rights Democrat, he entered the United States Senate in 1823, where he vigorously upheld the doctrine that

## Hazel

slavery was not a subject for Federal legislation. He attained special fame for his brilliant debate with Daniel Webster upon the relation of the states to the Federal government, in January, 1830. In the nullification controversy of 1832 he upheld South Carolina, and soon afterward he resigned from the Senate, was elected governor of his state and issued a defiant proclamation guaranteeing the maintenance of the nullification ordinance. Later, however, he exhibited commendable moderation and marked executive ability. From 1835 to 1837 he was mayor of Charlestown, and from 1837 until his death was president of the Louisville, Cincinnati and Charlestown railway.

**Hay-Pauncefote**, *pawns'foot*, **Treaty**, a treaty between Great Britain and the United States, negotiated in 1901 by Secretary of State John Hay for the Americans and Lord Pauncefote, ambassador to the United States, for the British. It recognized the right of the United States to construct, own and control a canal across the isthmus connecting North and South America and thus superseded the Clayton-Bulwer Treaty of 1850 (See CLAYTON-BULWER TREATY).

**Hay'ti**. See HAITI.

**Haze**, a condition of the atmosphere which prevents seeing objects through it distinctly. Haze varies in degrees of density and is caused in numerous ways, usually by quantities of fine dust. It may be raised by wind or by smoke arising from forest fires, as in the Rocky Mountain regions in the United States, or smoke arising from the burning of peat bogs, as in some portions of Europe. The color of the atmosphere and sky depends somewhat upon the formation of haze. That formed from smoke usually gives the atmosphere a dark, murky appearance, while that formed from dust may cause the atmosphere and sky to appear light gray, yellow or some other color, according to the color of the dust. Haze preceding a rain storm is usually caused by the presence of minute particles of vapor. The color of such haze is usually light gray.

**Hazel**, a genus of shrubs or small trees that belongs to Europe, North Africa, Asia and North America. The European hazel produces the nuts called filberts and grows best in a tolerably dry soil. In the United States there are two species, both of which bear small edible nuts, enclosed in a husk-like bur, covered with fine barbs. The early frost opens these burs and the nuts fall to the ground.

## Hazen

**Ha'zen**, WILLIAM BARCOCK (1830-1889), an American soldier, born in West Hartford, Vt., and educated at West Point. At the outbreak of the Civil War he was a captain in the regular army, but went to the front as colonel of a volunteer regiment. He won distinction at Shiloh, Corinth, Murfreesboro and Missionary Ridge, served through Sherman's Atlanta campaign, was prominent at the capture of Savannah and at the close of the war was brevetted major general in the regular army. For fifteen years afterward he served on the frontier, except during his absence in Europe as military attaché of the United States government. In 1880 he attained the rank of brigadier general, became chief of the signal service and accomplished a vast improvement in its equipment.

**Hazleton**, PA., the county-seat of Luzerne co., 24 mi. s. of Wilkesbarre, on the Lehigh Valley and other railroads. The city has a picturesque site, at an elevation of 1700 feet, in the anthracite coal region, and it has silk mills, knitting mills, foundries, machine shops and manufactories of carriages, lumber, coffins, caskets and other articles. It contains a state hospital for miners, Saint Gabriel's Academy, Hazleton Seminary, many churches and several banks. The place was settled in 1820 and was chartered as a city in 1890. Population in 1910, 25,452.

**Haz'litt**, WILLIAM (1778-1830), an English critic and essayist. In 1793 he became a student in the Unitarian College, Hackney, and on leaving it he devoted his time to portrait painting. This was in its turn renounced for literature, his first publication being an *Essay on the Principles of Human Action*. He delivered various series of lectures, contributed to the *Edinburgh Review* and with Leigh Hunt attempted a periodical, *The Examiner*, modeled on *The Spectator*. Among his chief works are *Characters of Shakespeare's Plays*, *A View of the English Stage*, *Lectures on the English Poets*, *Lectures on the English Comic Writers*, *Table Talk*, *Lectures on the Dramatic Literature of the Reign of Queen Elizabeth*, *Life of Napoleon Bonaparte* and *Sketches and Essays*.

**Head.** See SKELETON.

**Headache**, *hed'ake*, a pain in any part of the head, excepting the face. It is a symptom of disease, the seat of which, however, may be far from the location of the pain; as, for instance, a disordered stomach may produce pain in the forehead; neurasthenia may cause pain at the base of the brain, while a general headache may be produced by an unhealthy liver. The treat-

## Health

ment of headache should be governed entirely by the cause, when it is possible to ascertain it. The practice of taking anodynes to cure a headache is unreasonable, and it is the cause of much suffering, as in many cases it tends to create a pernicious habit. Most of the drugs are poisonous, and some of them, in certain conditions of the organs, are fatally so. In cases of chronic headache, a physician should be consulted in an effort to ascertain the cause, but acute attacks may generally be relieved by rest, lying down in a darkened room, and by careful diet.

**Headdress.** See HAT.

**Health** is that condition of the living body in which all the bodily functions are performed easily and perfectly and unattended with pain. Perfect health is rarely seen, and under the present conditions of living it can last but a short time. See HYGIENE; SANITARY SCIENCE.

**Health**, BOARDS OF, organizations established by a government for the purpose of protecting the health of its citizens. Boards of health are municipal, state or national, according to the authority by which they are established and the region over which they have jurisdiction. In the United States they are of municipal and state origin. Municipal or city boards of health are appointed by the city government and have jurisdiction over the region included in the city charter. Their most important duties are to prevent the spread of contagious disease by enforcing vaccination and forming and enforcing strict quarantine regulations, to prevent the adulteration of medicines and food, to prevent the sale of injurious drugs, to see that the municipality is kept free from the accumulation of garbage and other material that is liable to cause disease; also, to prescribe and oversee the duties of coroners.

State boards of health have a more general line of duties than municipal boards, and their function in many cases is advisory. Nearly all states and territories now have such boards, and their services are often of the highest value in preventing the spread of disease and in protecting the citizens of the state from the sale of injurious food products.

In the United States there is no national board of health, the duties of such a body being assumed by the marine hospital service, which is connected with the department of the interior. These duties consist chiefly in enforcing United States quarantine laws, which are enacted to prevent the entrance into the country of persons afflicted with contagious or infectious diseases.



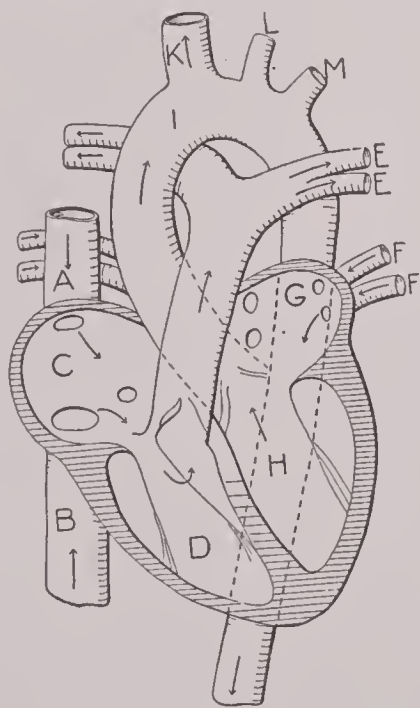
## Hearing

**Hearing**, *heer'ing*. See EAR, subhead *Hear-ing*.

**Hearst**, *hurst*, WILLIAM RANDOLPH (1863–), an American editor and politician, born in San Francisco, son of George F. Hearst, a noted politician and capitalist. He received his education at Harvard University and entered journalism, becoming editor and proprietor of the San Francisco *Examiner* in 1886. He later bought the New York *Journal* and *The Advertiser* and established the *Chicago American*. He was elected to Congress from New York and was made president of the National League of Democratic Clubs. He was a prominent candidate for the Democratic nomination for the president of the United States in 1904 and was defeated for the mayoralty of New York City on the municipal ownership ticket in 1905. He was the candidate of the Democratic party of New York for governor of the state in 1906, having first been nominated by an independent party created by his efforts.

**Heart**, *hahrt*, a hollow, muscular organ, which forces the blood through the veins and arteries and thus maintains the circulation. In mammals and birds the heart has four chambers or cavities, two auricles and two ventricles; but in most reptiles there are but three chambers, and in some still lower orders there are but two.

The heart in man is a cone-shaped organ, situated in the chest behind the sternum and placed obliquely in an inverted position. The base points upward, inward and to the right, and the apex downward, outward and to the left. About two-thirds of the heart is to the left of the median line of the body. The heart is sus-



HEART AND BLOOD VESSELS

A, B, Superior and inferior venae cavae; C, right auricle; D, right ventricle; E, E, pulmonary artery and branches; F, F, pulmonary veins; G, left auricle; H, left ventricle; I, aorta; K, innominate artery; L, left carotid artery; M, left subclavian artery.

## Heat

pendent in the chest by the large blood vessels attached to it and is surrounded by a serous membrane known as the *pericardium*. A similar membrane of finer texture, known as the *endocardium*, also lines the cavities. The heart is about 5 inches long, its greatest diameter is  $3\frac{1}{2}$  inches and the average weight of the organ in an adult is from 9 to 10 ounces. The walls are constructed of muscular fibers, and the muscular partition called the *septum* separates the organ into right and left sides. The left side contains the *left auricle* and *left ventricle*, and the right side, the *right auricle* and *right ventricle*. The right side of the heart forces the blood through the lungs and is connected with the pulmonary circulation. Because of the functions of this part of the heart the muscular walls are much thinner and weaker than those of the left side, whose function it is to force the blood through the arteries in the systemic circulation. The auricles occupy the base of the heart and are formed by very thin walls. The right auricle receives the blood from the *superior* and the *inferior vena cavae*, and the left auricle receives it from the *pulmonary veins*. The ventricles occupy the apex and force the blood through the arteries. Between the auricles and ventricles are valves, composed of a thin, strong white membrane, whose folds are so arranged that they allow the blood to flow from the auricle into the ventricle, but prevent its return when the muscles of the heart contract. The valve on the right side is known as the *tricuspid*, and that on the left side is called the *bicuspid*, or *mitral*, valve. The openings into the arteries are also guarded by valves, which in shape resemble a half-moon and are called *semilunar* valves. The course of the blood through the heart is illustrated in the diagram. See CIRCULATION.

**Heat**, *heet*. We recognize heat through the sense of touch. One body is hot; that is, it has considerable heat. Another is said to be warm; that is, it has a medium amount of heat. A cold body has but very little. All bodies have some heat, and *cold* is only a relative term, showing that the body to which it is applied has but little heat. The *temperature* of a body is its degree of heat. Hot bodies have a high temperature, and cold bodies, a low temperature. All bodies near one another have a tendency to become of the same temperature. If we place a hot iron on a cold one, in the course of time both become of the same temperature. Objects in the same room are usually of nearly the same temperature.

**WHAT HEAT IS.** Heat is supposed to be produced by the motions of the molecules of bodies. However close together these molecules may appear, they are not supposed to touch one another, and they are supposed to have a constant motion, called *vibration*. It is also supposed that all space, even that between the molecules, is filled with an immaterial and invisible substance, called *ether*. This ether conveys to other bodies the heat produced by the vibration of the molecules (See **ETHER**). When this vibration increases, the temperature of the body rises, and when it decreases, the temperature falls.

**WHERE HEAT COMES FROM.** The sun is the great source of heat. It warms the earth and all things on it. The stars also give off heat, but they are so far distant that we do not receive it. Mechanical action, such as rubbing bodies together, hammering them or compressing them into a smaller space, produces heat. Our hands are warmed by rubbing them together; a nail is made hot by hammering it; the barrel of a bicycle pump is warmed by the compression of the air while it is being forced into the tire of the wheel.

Chemical action, such as fire, produces heat. Fire is caused by the union of the oxygen of the air with the carbon in the fuel. The heat in our bodies is produced by the action of the blood and digestive fluids upon the food, and also by the action of the oxygen of the air upon the carbon with which it comes in contact in the lungs.

**HOW HEAT TRAVELS.** Heat travels in three ways: (1) By *conduction*. Heat travels by conduction when it passes from one part of a body to another part, without any noticeable movement in the body; such is the heating of a stove poker when one end of it is placed in the fire. If a silver spoon be placed in hot tea, the heat passes from the tea to the hand through the spoon; if placed in ice, the heat passes from the hand to the ice. Bodies through which heat passes readily by conduction, such as metals, are called good conductors; those through which it does not pass readily, such as wood, wool, fur and feathers, are called poor conductors. For this reason, iron tools are fitted with wooden handles; if used when hot, they do not burn the hand, and if used when cold, they do not conduct the heat away from the hand. Fur garments keep us warm, not because they produce heat, but because they prevent the heat of the body from passing off into the air.

(2) By *convection*. Heat travels by convection when it is carried by the circulation of the body itself; a good example is the warming of buildings by hot air from a furnace, or by hot water carried through pipes. This mode of carrying heat is also used for a number of other practical purposes.

(3) By *radiation*. Heat comes to us by radiation from the sun; also, from a grate, hot stove or the flame of a lamp. When it travels in this way, it always comes in straight lines and decreases in intensity as the distance from the source increases. That is, to be exact, the amount of heat varies inversely as the square of the distance from the source. If standing four feet from a fire you receive a certain amount of heat, you will receive only one-fourth that amount when eight feet away.

**WHAT HEAT DOES.** (1) *It makes bodies larger.* When a body is heated, it increases in size. If an iron bar, which exactly fits a hole in an iron plate, is heated, it becomes too large to pass through the hole. This increase in size is called *expansion*, and it can be easily seen by observing the liquid in a thermometer; as the temperature rises, the liquid expands and rises in the tube. The force which accompanies the change of size in bodies on account of heating and cooling is very great and is turned to a number of practical uses. Wagon tires are made just a little smaller than the rim of the wheel; they are then heated, when they become large enough to fit upon the wheel; as they cool, they contract and draw the parts of the wheel firmly together. Steel frames of buildings, the trusses of bridges and the plates of boilers are riveted with red-hot rivets; as the rivets cool, they draw the parts so firmly together that they make these structures very solid and strong. See **EXPANSION**.

(2) *It changes solids to liquids.* Ice is changed to water and metals become liquid when heated to a sufficient temperature. The temperature at which a substance changes from a solid to a liquid is called its *melting point* or *fusing point*. The melting point of most metals is very high.

(3) *It changes liquids and solids to vapor.* Some substances, such as camphor and zinc, when heated to a high temperature, take the form of vapor instead of liquid. When liquids are raised to the boiling point, they change to vapor, as boiling water changes to steam. The vapor occupies much more space than the liquid, and its expansive force is very great. In the



## Heath

case of steam, this force is used in the operation of the steam engine.

(4) *It produces light.* When certain substances are raised to a high temperature, they give off light, as a white-hot iron, a glowing coal or a flame. All such substances radiate both light and heat, which come to us together, as in the rays from the sun.

**Heath**, *heeth*, or **Heather**, *heth'er*, the popular name for many plants, most of which



HEATHS  
Three species in blossoms.

belong to the same genus, and all of which belong to the heath family. They are widely distributed over Europe and the Mediterranean region, and are found most abundantly in South Africa. From 400 to 500 species are known, and twelve or fifteen of these are natives of Europe. Many of them bear flowers of brilliant color, and in certain sections the heather is a favorite and characteristic plant. Scotch heather has low, grayish, hairy stalks and broom-like branches, with needle-shaped leaves and sprays of countless, tiny, purple blossoms. In Scotland the poor use heather for thatching their houses, and in other European countries it is used in making brooms, brushes and bed mattresses. One species only of heather is found in the United States and that grows sparingly in a few localities on the Atlantic coast; but there are many American plants of the same family which are familiar, including, for instance,

## Heating and Ventilation

the trailing arbutus, the huckleberry and the cranberry. In physical geography, the term *heath* is applied to a tract of low, level land covered with shrubs. The name originated in Great Britain, where it was first applied to land covered with the heath plant. Heaths are not common in America, and the term is seldom applied to areas in the United States.

**Heating and Ven'tila'tion.** The condition of the atmosphere in houses and public buildings is of such importance to health and vigor of mind, that heating and ventilation are receiving more and more attention as sanitary science is better understood. The lack of proper care has been the cause, and it is still responsible, for an incalculable amount of human disease and suffering. The temperature which is usually considered best in a room whose occupants are not engaged in any exercise varies from 68° to 70° Fahrenheit. Individuals may require higher temperature, but overheated rooms are responsible for much sickness in cold weather, because of the inevitable sudden changes experienced in passing in and out of doors. On the other hand, too low a temperature is injurious, especially to those who are sitting quietly.

Ventilation is a means of renewing the atmosphere in rooms and of maintaining its purity by driving out foul air and admitting fresh air without drafts. Carbonic acid gas, which is breathed from the lungs of all animals, is destructive of health if breathed again into the lungs. Moreover, the human breath pollutes the air with small quantities of ammonia and with organic matter, especially bacteria, and so tends to make the atmosphere not only unpleasant but dangerous for respiration. Authorities disagree in estimating the amount of pure air necessary for an adult, but it is generally admitted that not less than one thousand cubic feet of fresh air per hour should be allowed for each healthy person. Invalids require from three to four times as much. It is possible, of course, to secure change of air in a room very quickly by throwing open doors and windows, but the sudden change in temperature and the resulting drafts are dangerous to the occupants. Accordingly, in all living rooms some provision must be made for the removal of foul air and the introduction of fresh air. Heating and ventilation are so closely allied that they must be considered together.

One of the earliest methods of heating rooms was by the open fireplace, and this still remains

## Heatstroke

an excellent method, though the waste of heat is considerable. It was this waste, in fact, that led to the introduction of closed stoves, first made of earthenware and then of metal. These are now constructed in an infinite number of varieties and are commonly in use throughout America and in Europe. They do save fuel, but in so doing they have prevented the ventilation which fireplaces gave and are liable to overheat the rooms and render the air too dry. Other methods of heating are now generally in use. Air-tight furnaces, surrounded by jackets, connected by pipes with different parts of the building, from which return shafts bring foul air into the furnace proper, are very generally in use. In such cases a conduit from the open air leads a supply of pure air inside the jacket of the furnace. In other systems, steam and hot water are forced through pipes to all parts of buildings by heat, and this forms an effective way of warming the rooms, though a separate system of ventilation must be used to make either steam or hot water satisfactory. From their superior neatness and cleanliness, steam and hot water seem to be gradually displacing the hot air systems.

Proper heating and ventilation is one of the most serious problems that confronts the teacher in small schools. Usually large stoves are placed in the room, and these make the temperature too high for the children sitting near them before the air in the remote portions of the room is warm. Such stoves should be surrounded by a jacket of tin or sheet iron, reaching from the floor to a point some distance above the heads of the children. A pipe laid from the outer air, under the floor and through an opening beneath the stove, will give a supply of pure air which, as it is heated by the stove, will be forced up into the room. Provision should be made to carry away the foul air from near the floor in some part of the room distant from the stove. If it is impossible to have the stoves fitted up as described, a screen may be used to protect those sitting near the stove from the heat, and a supply of pure air may be admitted by fastening a board six or eight inches wide at the bottom of the window casing, so that it fits tightly into the space, and then raising the window about four inches. The air is then deflected upward and away from persons sitting in the room.

**Heatstroke.** See SUNSTROKE.

**Heaven,** *hev'n*, (probably signifying that which is *heaved* up, or elevated), in a physical

## Hebrew Language and Literature

sense, the azure vault which spreads above us like a hollow hemisphere and appears to rest on the earth at the horizon. It is really the appearance presented to us by the immeasurable space in which the heavenly bodies move, and the azure color is due to the presence of particles of dust in the air. In theology, this word denotes a region of the universe where God's presence is especially manifested, in contrast with the earth. Among Christians the opinion has been that heaven is the residence of the Most High, the holy angels and the spirits of just men made perfect, that this abode is eternal and its joys intensely spiritual.

**Heaves,** *heevz*, or **Broken Wind**, a disease in horses often accompanied by an enlargement of the lungs and heart, which disables them for bearing fatigue. In this disease the expiration of the air from the lungs occupies double the time that the inspiration does and requires also two efforts. It is caused by rupture of the air cells, and there is no known cure for it.

**He'be**, in Greek mythology, the goddess of youth and the cupbearer to the gods, a daughter of Jupiter and Juno and the wife of Hercules after he had been made a god. According to some accounts she gave up her office when she became the wife of Hercules; according to others, she was dismissed because she stumbled while serving the gods. She was succeeded by Ganymede. See GANYMEDE.

**Hébert**, *a bair'*, JACQUES RÉNE (1755-1794), a French journalist and politician, popularly known as Père Duchesne, from the revolutionary journal of that title which he founded at the outbreak of the Revolution. The radical opinions and violent language of this journal made Hébert popular with the people, and he was elected attorney-general of the commune and a member of the National Convention. As a member of the committee appointed to try Marie Antoinette, he increased her sufferings by the malicious and brutal charges which he brought against her. His violent methods were recognized by Robespierre as a menace to the cause of the Revolution, and he was accordingly put to death in March, 1794. Later in the same year Robespierre met the same fate.

**Hebrew Language and Literature**, the language and literature of the Jews or Hebrews at that period when they formed a compact nation inhabiting Palestine. In the antiquity of its literary remains, Hebrew far surpasses the other Semitic languages. The language is deficient in grammatical tech-



nicalities, especially in the inflection of nouns and verbs and in possessing no neuter gender. The alphabet is composed of twenty-two consonants, the vowels being expressed by marks above or below these letters. The accents and marks of punctuation amount to about forty. The writing is from right to left. There are three kinds of Hebrew alphabets now in use, the square, or Assyrian (properly called the Babylonian), the most common in print; the rabbinical, or medieval, and the cursive, or alphabet used in ordinary writing.

Extant Hebrew literature is almost entirely comprised in the Old Testament, which represents a period of at least one thousand years, from 1200 B. C., when some of the poetical portions, such as the song of Deborah in the fifth chapter of *Judges*, were already in existence, to 200 B. C., or later, when the book of *Daniel* and some of the *Psalms* were written. During this period the written language underwent surprisingly little change. In passing from the book of *Genesis* to the books of *Samuel* we do not recognize any very striking difference in the language. Even those who assert that the Pentateuch as a whole is of a comparatively late era admit the great antiquity of some of its contents, which do not differ in language from the rest. The writings which belong to the period following the Babylonish captivity differ from those which belong to the preceding age; the influence of the Aramaic or Chaldee language, acquired by the Jews in the land of their exile, greatly corrupted their tongue. Belonging to this age are the historical books of *Chronicles*, *Ezra*, *Nehemiah* and *Esther*. In the prophets who prophesied during and after the captivity, with the exception of Daniel, the Aramaic element is by no means so strong as we might expect, as their style was evidently formed on that of the older prophets. At what time Aramaic became the dominant element, it is impossible to determine, but by the time of the Maccabees it had become the spoken language. The fragments of the popular language in the New Testament are all Aramaic, and ever since that time the Hebrew proper has been preserved and cultivated only as the language of the learned and of books, and not of common life.

After the return from the captivity, the Jewish literature was carefully cultivated. Under Ezra the Scriptures were collected and arranged into a canon. The Pentateuch was publicly read, taught in schools and translated into Aramaic. The legal or religious traditions explanatory or

complementary to the law of Moses were collected and established as the oral law. These labors resulted in the *Midrash*, a general exposition of the Old Testament, divided into the Halacha and the Haggada. To the Maccabean era belong the Apocrypha (in Greek), various Greek versions of the Bible and several collections of prayers, poems and proverbs. To the succeeding epoch belong some celebrated doctors of law—Hillel, Shammai, Gamaliel and others; while the age following the destruction of Jerusalem (70 A. D.) witnessed the completion of the New Testament and the works of Josephus, written, however, in the Greek language. On being driven from their capital by the Romans, numerous schools were established by the Jews in which their language and literature were taught. Of these schools the most celebrated were those of Babylon and Tiberias. The *Mishna*, which contains the traditions of the Jews and interpretations of the Scriptures, is supposed to have been compiled in the latter part of the second or in the earlier part of the third century; and the rabbis of Tiberias and Babylon wrote numerous commentaries on it, which were at length collected into two separate works, the *Jerusalem Talmud*, completed about the end of the fourth century, and the *Babylonian Talmud*, about a century later, under the care of Rabbi Ashe. What was called the *Targums*—that is, Aramaic translations of portions of the Old Testament—belong partly to times earlier, partly to times later than this period. The Jews latterly adopted the languages of the various peoples among whom they happened to dwell, though they also wrote in classical Hebrew, as well as in the less pure form of the *Rabbinical* Hebrew, and Hebrew is the language of the synagogues to-day, except in the reform communities of America and Germany. It also serves as the medium of correspondence among Jews in different parts of the world. This language, however, is not the pure Hebrew of the Bible and synagogue. The most brilliant epoch of Medieval Jewish literature was during the time of the Moors in Spain. Of modern literature in the Hebrew language, there is little that is of general interest.

**Hebrews.** See JEWS.

**Hebrews,** THE EPISTLE TO THE, a book of the New Testament, concerning the authorship of which there is much doubt. Many claim it to be the work of Apollos, a Jew famed for his eloquence, but in the Scriptures it is attributed to Saint Paul. The place and date of

## Hebrides

writing are not fixed. The letter is designed to help its readers, whoever they were, in avoiding the dangers which would lead them to forsake the faith in Christ. It shows oratorical power and sets forth Christ as the end and fulfillment of the law.

**Hebrides**, *heb're deez*, or **Western Islands**, a series of islands and islets off the west coast of Scotland; usually divided into the Outer Hebrides, of which the principal are Lewis, Harris, North Uist, Benbecula, South Uist and Barra, and the Inner Hebrides, Skye, Mull, Islay, Jura, Coll, Rum, Tiree and Colonsay. There are about four hundred islands in all, but only ninety are inhabited. They are divided between the counties of Ross, Inverness and Argyre. The islands are on the whole mountainous and abound in moss and moor. The climate, although humid, is mild. The soil is mostly poor, and agriculture, except in certain places, is very backward. Oats, barley, potatoes and turnips are almost the entire produce of the soil. Cattle rearing and fishing are the chief industries. Population, about 100,000.

**He'bron** (anciently Kirjath-arba, now El-Khalil), a town in Palestine, 21 mi. s. w. of Jerusalem. It lies in the narrow valley of Mamre, about 2800 feet above sea level. Hebron is one of the oldest of existing towns. It was the residence of Abraham and the patriarchs, and David was here crowned king of Israel. A mosque, called El-Haram, formerly a church, is alleged to stand over the tombs of Abraham, Isaac, Jacob, Sarah and Rebecca. The city fell into the hands of the Mohammedans under Saladin in 1187, and since then it has been considered a sacred spot by them. Population, about 19,500.

**Hecate**, *hek'a te*, an ancient Greek goddess, whose powers were various. She could bestow wealth, victory, wisdom, good luck and prosperity, and she shared with Apollo the power of purifying from sin. She was latterly confounded with other divinities, such as Ceres, Diana and Proserpina, and finally she became, especially, an infernal goddess, who was invoked by magicians and witches. Dogs, honey and eggs were offered to her at places where three roads met. She was often represented with three bodies or three heads and with serpents round her neck.

**Heck'les** or **Hackles**, an apparatus employed in the preparation of animal and vegetable fibers for spinning. It consists of a series of long metallic teeth, fixed in a wooden or metallic base, in several rows, alternating with one another at short distances apart. The material

## Hedgehog

is drawn through the heckles, which comb the fibers out straight and fit them for the operations that follow in their manufacture into yarn or thread.

**Hec'la** or **Hekla**, a volcano of Iceland, about 20 miles from the southwest coast. It is about 5000 feet in height and has several craters. The mountain is composed chiefly of basalt and lava and is always covered with snow. One of the most tremendous eruptions occurred in 1783, after which the volcano remained quiescent till September, 1845, when it again became active and continued, with little intermission, till November, 1846, to discharge ashes, masses of pumice stone and a torrent of lava. The last outbreak was in March, 1878.

**Hec'tor**, in Greek mythology, the son of Priam and Hecuba, the bravest of the Trojans, whose exploits are celebrated in the *Iliad*. Having slain Patroclus, the friend of Achilles, he was in turn killed by Achilles, and his body was dragged at the chariot wheels of the conqueror about the walls of the city. Priam afterward gained possession of it and gave it solemn burial. Hector is the most attractive warrior in the *Iliad*, and one of the finest episodes described therein is his parting from his wife, Andromache, before his last combat.

**Hec'uba**, of Phrygia, in Greek legend, the second wife of Priam, king of Troy, to whom she bore Hector, Paris, Cassandra, Troilus and other children. After the fall of Troy she was given as a slave to Odysseus, and, according to one form of the legend, in despair she leaped into the Hellespont.

**Hedgehog**, *hej'hog*, an insectivorous animal, common in Europe and parts of Asia and Africa.



HEDGEHOG

It is about nine inches long and is covered with short, sharp spines. By means of a special muscle it is able to roll itself up into a ball and



## Hegel

erect its spines, and in this form it can defy most of its enemies. The hedgehog has an elongated nose, short ears and numerous teeth. It usually frequents small thickets and feeds on fruits, roots, insects, birds and reptiles. The female bears four to eight young at a birth, the young soon becoming covered with prickles. In the United States the name hedgehog is often applied to the native porcupine.

**Hegel**, *ha'gul*, GEORG WILHELM FRIEDRICH (1770–1831), a German metaphysician who has profoundly influenced modern theological and philosophical thought. He was born at Stuttgart and was educated at the University of Tübingen, where he became a friend and colleague of the philosopher Schelling. Through Schelling's influence Hegel was received at the University of Jena, where he became a lecturer. After the Battle of Jena he was made director of the Nuremberg gymnasium and was later appointed professor of philosophy at Heidelberg, then at Berlin, where he became known as a prominent leader in German philosophical thought.

Hegel's attempt as a philosopher was to define the relation between the finite self and the universal self, or God. From childhood he had delighted in the apparent contradictions of life. As a philosopher he found in the contradictions of thought and experience the key to the interpretation of existence. For example, he found that the personal self is a conscious self only as it recognizes its relations to others; that is, as it becomes a social self. According to Hegel's belief, the experience of any given moment is in reality that of a succeeding moment in which the experience comes to our knowledge, for we are always conscious of that which is just past—never of the immediate present. In a like manner, happiness and virtue are known only in the conquest of their opposites, sorrow and vice. Our very life consists in the recognition and overcoming of these contradictions. We learn virtue in our antagonism with vice; we come upon knowledge in our actual struggle with all that would baffle and confuse. The more we project ourselves into the lives of others and the more we encounter and become victors in the never-ceasing conflicts that present themselves, the more fully do we realize our deepest self, that is, the one universal self, God, whose life consists in the personal conquest over the infinitely varying conditions which represent the sum total of experience and whose being is the unified whole of consciousness.

## Heidelberg

Hegel was appointed school councilor by the Bavarian government and was also made a member of the commission of education by the Prussian government, but his influence on education is due more to his philosophy than to his work while in these positions. While he did not write directly upon the science of education, the principles stated in his philosophy have been far-reaching in their effect on changing educational thought and systems. He attributed great importance to the family and state as factors of education, and he placed great stress upon authority in the instruction of children. He believed that the reasoning powers should not be developed too early, but that they should receive attention as soon as the child had acquired a good fund of knowledge through the senses. He also believed in the value of the classics as a source of culture. His most important works are *Logic*, *The History of Philosophy*, *Esthetics* and *Philosophy of Religion*. A good exposition of his doctrines is set forth in *The Logic of Hegel*, by William T. Harris.

**Hegira**, *hej'e rah* or *he j'i'ra*, the term commonly used to indicate Mohammed's flight from Mecca, July 16, 622 A. D. The Caliph Omar instituted, in 639 or 640, a new Moslem calendar, to begin with the first day of the first month in which the flight took place. The Mohammedan year, as a lunar year, is shorter than ours by about eleven days. A rough and ready method for finding the year in our calendar corresponding to a given year in the Mohammedan is to subtract from the latter  $\frac{1}{3}$  of itself and add 622 to the remainder. As, 1324 of the Mohammedan calendar corresponds to 1906 ( $1324 - 40 + 622 = 1906$ ). To find the precise year and day, multiply the year of the Hegira by 970,224, strike off from the product six decimal figures and then add 621.5774; this will give the year of the Christian era; the day of the year is obtained by multiplying the decimal figures by 365.

**Heidelberg**, *hi'del berK*, a town of northern Baden, situated on the left bank of the Neckar, in one of the loveliest districts of Germany, about 12 mi. s. e. of Mannheim and 55 mi. s. of Frankfurt. It stands on a narrow strip between the river and the castle rock, and it consists chiefly of one main street. The castle, begun in the end of the thirteenth century and exhibiting elaborate examples of early and late Renaissance architecture, is the most remarkable edifice in Heidelberg and one of the most famous structures in Europe. It is now an ivy-clad ruin, but it is carefully preserved from further decay; it stands

## Heidelberg University

high above the town in the midst of a beautiful park. One of the greatest curiosities of the place is the Heidelberg tun, kept in a cellar under the castle. It is 36 feet in length, 26 feet in diameter and is capable of holding 800 hogsheads. Heidelberg is also famous for its great university, the oldest in Germany. The principal industry of the town is brewing. Population in 1910, 56,016.

**Heidelberg University**, one of the most renowned of German universities, founded at Heidelberg by Elector Rupert I in 1386. It was originally modeled after the University of Paris, and in the beginning it was a Catholic institution. After the Reformation it became strongly Calvinistic. In 1802 it was reorganized on a much larger scale, and since that time it has become famous. It maintains departments of theology, law, medicine and philosophy, which includes the arts and sciences. The library contains over 500,000 volumes and a large number of manuscripts. There are over 150 professors and instructors in the faculty, and the number of students is about 1500. This university is famous for the large number of American students enrolled.

**Heilbronn**, *hile bron'*, a town of Württemberg, Germany, situated on the Neckar, about 33 mi. n. e. of Stuttgart. Heilbronn was founded about 700, became a free city in 1360 and passed into the possession of Württemberg in 1802. The old portion of the town contains many places of historic interest, including some connected with the careers of Götz von Berlichingen, Schiller, Charles V and other famous characters. The city is now of industrial importance for its manufacture of chemicals, silver utensils, machinery, sugar and other products. It also has four fine harbors. Population in 1910, 42,688.

**Heilprin**, *hile'prin*, ANGELO (1853-1907), an American scientist and traveler, born in Hungary. He came to the United States when three years of age, but returned to Europe to complete his education, studying in London, Geneva and Vienna, where he made a specialty of natural history. On his return to the United States he was appointed professor of paleontology and geology at the Philadelphia Academy of Natural Sciences and occupied the position for sixteen years, during a portion of which time he was also executive curator of the cabinet. He was the first president of the Geographical Society of Philadelphia. During his connection with the Academy of Natural Sciences, Professor Heilprin made numerous journeys to Florida, Bermuda

## Heintzelman

Islands and Mexico in the interests of his department, and he thoroughly investigated the geology of each of these regions. He ascended a number of the highest volcanoes in America, including Orizaba and Popocatepetl. He led the Peary relief expedition in 1892, and in 1902 he acquired wide celebrity through his investigation of the eruption of Mount Pele in Martinique, ascending the volcano while it was in a state of eruption. Professor Heilprin was a very prolific writer. Among his best-known works are *The Geographical and Geological Distribution of Animals*, *Principles of Geology*, *The Earth and Its Story* and *Alaska and the Klondike*. He was also chief editor of a revised edition of Lippincott's *Geographical Gazetteer*.

**Heimdall**, *hime'dal*, in Scandinavian mythology, the son of Odin, who kept watch on the rainbow bridge over which the gods passed from Asgard, their home, to the earth. His sight and hearing were more acute than those of mortals, and nothing could evade his vigilance.

**Heine**, *hi'na*, HEINRICH (1797-1856), a German poet and author, born of Jewish parents at Düsseldorf. He studied law at Bonn, Berlin and Göttingen; took his degree at the last-mentioned place, and allowed himself to be baptized that he might obtain a license to practice. His revolutionary tendencies and his open admiration for Napoleon made him exceedingly unpopular in Germany, and by 1830 it had become practically impossible for him to live there. He removed, therefore, to Paris, where he was very well received and where he lived until his death.

Heine's first published work was his *Poems*, which appeared in 1822. Although many of these surpassed in lyric beauty anything in German literature, they attracted comparatively little attention. His most famous prose work, the *Harzreise*, appeared in 1826, and this was afterward combined with *Norderney*, *Das Buch Le Grand* and *Die Bäder von Lucca* in the *Reisebilder* (Pictures of Travel). The *Buch der Lieder* (Book of Songs) contains his collected lyrics. During his last years, when helpless with paralysis, he continued to produce his wonderful melodious songs, satires and humorous pieces. Heine's is the greatest name in German literature since Goethe. The delicacy and melody of his lyrics, the raillery, the graceful, glancing wit of his *Reisebilder*, have never been approached.

**Heintzelman**, *hine'tsel man*, SAMUEL PETER (1805-1880), an American soldier, born in Lancaster County, Pa., and educated at West Point.



He served on the frontier, took part in several indian wars and in the Mexican War and at the outbreak of the Civil War became brigadier general of volunteers. He participated in the Peninsula Campaign, was promoted to become major general of volunteers and later was made brevet brigadier general. He was at one time in command of the defenses at Washington, in 1864 was commander of the Department of the West and was retired in 1869 with the rank of major general.

**Heir**, *air*, in law, one to whom the property of a deceased person passes. In America it denotes those to whom the *real* property descends, not by will, but only when the will is lacking (See DESCENT; WILL). In other countries, however, the term is used more broadly, to include all who have rights to property of a deceased person, either through will or by the natural laws of descent. See REAL PROPERTY; PERSONAL PROPERTY.

**Hek'la**. See HECLA.

**Hel**, *hale*, in Norse mythology, the daughter of Loki, the goddess of the dead, who dwelt beneath one of the three roots of the ash Yggdrasil. Dark rivers surrounded her abode, and a dog watched without. She herself, in the guise of a woman of half black and half fair complexion, was supposed to ride about on a three-footed horse. She was often to be propitiated by an offering of oats.

**Hel'der**, a fortified seaport of the Netherlands, in the most northern part of the Province of North Holland, opposite the island of Texel and commanding the entrance to the Zuyder Zee. From a fishing town Napoleon converted it into a fortress and naval station of the first rank and called it his "northern Gibraltar." Being much exposed, the port and coasts are protected by gigantic dikes, one of which is 6 miles long and built entirely of Norwegian granite. In 1673 a famous naval battle occurred off this point between the combined fleets of France and England on one side, and the Dutch fleet under Van Tromp and De Ruyter, on the other, the latter being successful. Population in 1910, 27,156.

**Helen**, in classical legend, the most beautiful woman of her age, the daughter of Jupiter and Leda and the sister of Castor and Pollux. By the advice of Ulysses, her numerous suitors had bound themselves by oath to respect her choice of a husband and to avenge any injury done to her or to her husband through her. When, therefore, after her marriage with Menelaus, she

was carried off by treacherous Paris, her former suitors fulfilled their vow and set forth against Troy, the city of Paris. On the death of Paris, Helen was married to his brother, Deiphobus, but after the end of the struggle she was again received by Menelaus and they returned to Sparta, where they ruled in peace until the death of Menelaus. According to most legends Helen was afterwards murdered at Rhodes.

**Hel'ena**, ARK., the county-seat of Phillips co., 95 mi. e. of Little Rock, on the Mississippi River and on the Saint Louis, Iron Mountain & Southern and other railroads. The city has an extensive trade and contains lumber and cottonseed oil mills, foundries and other factories. One of the battles of the Civil War occurred here, July 4, 1863, between a Union army under General Prentiss and a Confederate force under General Hohnes. The city has a public library, an excellent Federal building, Jefferson High School and Sacred Heart Academy. Population in 1910, 8772.

**Helena**, MONT., the capital of the state and the county-seat of Lewis and Clarke co., 73 mi. n. e. of Butte, on the Great Northern and the Northern Pacific railroads. The city has a picturesque location and is surrounded on all sides by the Rocky Mountains. The Montana Wesleyan University is located here, and the city has public, state and other libraries. Among the other important structures are the Federal building, the state capitol, the courthouse, the high school, Saint John's Hospital and several fine churches. There are extensive gold, silver and iron mines in the vicinity, and the city contains machine shops, smelters and flour and lumber mills. The place was settled as a mining camp in 1864 by four despondent prospectors who had named the gulch "Last Chance" and had vowed to give up their hunt for gold if they found nothing at this place. The first panful of gravel washed out \$20 in coarse gold, and during the next six years \$15,000,000 were taken out of this camp. Helena has been the capital of the state since 1869. Population in 1910, 12,515.

**Helgoland**, *hel'go lahnt*, or **Heligoland**, an island belonging to Germany, in the North Sea, about 40 mi. from the mouth of the Elbe. It is  $1\frac{1}{4}$  miles long and  $\frac{1}{2}$  mile broad, and the highest point is 200 feet. Its rocks, of reddish sandstone, present a perpendicular face to the sea, but they are being rapidly eaten away by the waves. The island produces potatoes, barley and oats, but oysters and lobsters are the chief products. It is much frequented as a bathing resort. In

## Helianthus

ancient times it was held in veneration and was sacred to the god Fosite. The inhabitants, of Frisian descent, are mainly fishers, pilots and lodging-house keepers. Helgoland was captured by Great Britain from Denmark in 1807 and became a German possession in 1890, in exchange for a portion of what is now British East Africa. Population in 1910, 2500.

**He'lian'thus.** See SUNFLOWER.

**Hel'icon**, a mountain range of Greece, in the west of Boeotia, in one sense a continuation of the range of Parnassus. It was the favorite seat of the Muses, who, with Apollo, had temples here. In it, also, were the fountains of Aganippe and Hippocrene. The highest summit is more than 5000 feet in altitude.

**Hel'igoland.** See HELGOLAND.

**Heliograph**, *he'le o graf*, or **He'liostat**, a name given to various contrivances for reflecting the sun's light, either temporarily or continuously, to an observer at a distance. The simplest heliograph is a mirror hung up at a distant station so as to reflect a flash to the observer whose station may be many miles from it. This mirror is generally so adjusted that the flash occurs exactly at some prearranged hour, and by being in readiness the observer can get an observation with precision as regards time. Some heliographs are visible for 80 miles. By being fitted with an adjustment of clockwork, the mirror can be made to revolve with the sun and to reflect a beam of sunlight steadily in one direction. An instrument with this attachment is often called a *heliotrope*. The heliograph has been used for signaling in war, and it is employed by the United States coast and geological surveys in measuring long distances by triangulation.

**He'liop'olis** (City of the Sun), the Greek name of an ancient city, called variously On, Rameses or Beth-shemesh, in the Hebrew Scriptures, and now called Matarich. It is situated a little north of Memphis and was one of the most ancient and extensive cities of Egypt under the Pharaohs. During the flourishing ages of the Egyptian monarchy, the priests taught within its temples, and both Eudoxus and Plato visited its famous schools. Here Joseph and Mary are said to have rested with the infant Christ. Near the village stands the Pillar of On, supposed to be the oldest Egyptian obelisk, 67½ feet high and 6 feet broad at the base. The obelisks known as Cleopatra's needles, of which one is in New York, formerly stood here.

## Hell

**He'lios**, in Greek mythology, the god of the sun, son of Hyperion and Theia, and brother of Aurora. He was supposed to dwell in the ocean behind Colchis, from which he issued in the morning and to which he returned at night. His worship was widespread, and he had temples in Corinth, Argos, Troezen, Elis and Rhodes, the Colossus of which was a representation of Helios. He was later confounded with Apollo.

**He'liostat.** See HELIOGRAPH.

**He'liotrope**, a genus of plants. The members of the species are herbs or undershrubs, mostly natives of the warmer parts of the world. The common heliotrope is native to the south and west of Europe; it has small white or pale red flowers, with a fruit of four drupes, under a thin, fleshy covering. A South American species is a very fragrant garden plant, growing to about two feet in height and bearing small lilac-blue flowers.

**Heliotrope** or **Bloodstone**, a variety of quartz, partaking of the character of jasper or of chalcedony. It is of a deep green color and is covered with red spots. It is hard and is used for burnishers; the finely-marked stones are prized for seals, signet rings and other ornaments. They are found in Tartary, Persia, Siberia, in the island of Rum, Scotland and elsewhere. It received the name *heliotrope*, or *elitropia*, because it was said that if the mineral were put into water in a basin, rubbed with the juice of the plant heliotrope and exposed to the sun, the water would appear red and the sun blood-like, as if it were eclipsed. The stone rubbed with the juice of the plant was said to render its wearer invisible. The ancients valued the heliotrope for gem purposes.

**He'lium**, the name given to a chemical element found in small quantities in the atmosphere, from which it is separated during the manufacture of liquid air. Helium is a gas, and it is next to hydrogen in lightness, is only slightly soluble in water and is chemically inactive. It is regarded only as a laboratory curiosity.

**Hell** signified originally the covered or invisible place. In the English Bible the word is used to translate the Hebrew *sheol* (grave or pit) and *Gehenna* (properly, the valley of Hinnom), as well as the Greek *Hades* (the unseen). In the Revised Version of the New Testament, however, hell is used only to translate *Gehenna*, *Hades* being left where it stands in the Greek. In common usage hell signifies a place or con-



## Hellas and Hellenes

dition of suffering of the wicked after death. Christian sects differ in their opinions as to the length and kind of punishment. Different ones declare that bodily torture is inflicted; that the fire in hell means only that the unrighteous are purified; that the suffering is eternal; that the suffering lasts only till the soul is purified. The Eastern and Western churches are at one as to the punishment of hell being partly "a pain of loss," that is, the consciousness of being debarred from the presence of God, and partly a "pain of sense," that is, real physical suffering. See GEHENNA; HADES.

**Hel'las and Hellenes**, *hel'leenz*. See GREECE.

**Hel'lebores**, a genus of perennial, low-growing plants, with leathery leaves and yellowish, greenish or white flowers. The black hellebore of the ancients, produced from the roots, is a violent poison, but it has some medicinal value when used in small quantities. The Greeks thought it would drive away sadness and make the mind clear and bright. White hellebore is a very different plant, belonging to the lily family.

**Heller**, STEPHEN (1814-1888), a Hungarian musician, born in Budapest. He began his studies in his native city and continued them at Vienna, where he made his *début* as a pianist in 1827. Two years later he began a successful concert tour through Europe. Soon after, he fell ill and was adopted by a wealthy family of Augsburg, through whose kindness he continued his studies. He went to Paris, where he associated with Chopin, Liszt and Berlioz and became well known as a pianist. His compositions are not regarded so highly, but they are filled with original themes and beautiful melodies. He was the author of numerous studies and exercises for the piano, which have become very popular.

**Hel'lespont**. See DARDANELLES, THE.

**Hell Gate**, the name given to a pass in East River, between Long Island and Manhattan Island and between Long Island and Ward's Island. The pass is a portion of the strait which connects New York Bay with Long Island Sound. The reefs of rock in the main passage formerly made the pass very dangerous, on account of the currents and eddies caused by the rising and falling tides. By extensive undermining and blasting these obstructions were removed by the government in 1885.

**Helmet**, an article of armor to protect the head. It is a development of the open head-

## Helsingfors

dress of early times. Homer represents his heroes wearing bronze helmets with lofty crests. Helmets were common also among the Romans, but they did not have protection for the face. In the Middle Ages they were made of steel and provided with bars and flaps for protection in battle. They were made in various styles, some having a *beaver*, or movable piece, and some a *visor*, which could be lowered to protect the eyes but allowed the wearer to see through small slits. The modern military helmets afford no protection for the face.

**Helmholtz**, *helm'hohltz*, HERMANN VON (1821-1894), a German physiologist and physicist, born at Potsdam and educated at Berlin. In 1848 he became professor of anatomy at the Academy of Fine Arts, Berlin, and in the next year he obtained the chair of physiology at Königsberg, from which he was successively transferred to the same post at Bonn and later at Heidelberg. In 1871 he was appointed professor of physics at Berlin, and through his efforts Berlin became the greatest center in the world for the study of physics through experiment. His work was chiefly in those departments of physics which are in closest relation with physiology, notably in acoustics and optics. Of his many publications the best known are *The Conservation of Force*, *Manual of Optics*, *Popular Lectures on Scientific Subjects* and *Sensations of Tone as a Physiological Basis for the History of Music*.

**Heloise**, *a lo eez'*. See ABELARD.

**He'lots**, slaves in ancient Sparta. They were the property of the State, which alone had the disposal of their life and freedom and which assigned them to certain citizens, by whom they were employed in private labors. Agriculture and all mechanical arts at Sparta were in their hands, and they were also obliged to bear arms for the State in case of necessity. They behaved with great bravery in the Peloponnesian War and were rewarded with liberty (431 B. C.), but two thousand appear to have been subsequently massacred. They rose against their masters several times, but were finally completely subjugated.

**Hel'singborg**, a seaport in Sweden, opposite the Danish city of Elsinore. It contains manufactures of sugar, salt, machinery, leather and chemicals and carries on a heavy trade with Denmark. It has a spacious harbor. Population in 1911, 33,225.

**Hel'singfors**, a seaport of Russia, capital of the grand duchy of Finland and of the Gov-

## Helvetii

ernment of Nyland, 191 miles northwest of Petrograd. It has manufactures of linen, sailcloth and tobacco and an important trade in timber, corn and fish. It is beautifully situated on a broad peninsula and has one of the best harbors in the Baltic Sea. It is second only to Cronstadt as a naval station. Helsingfors has many fine buildings, broad, attractive streets and good educational institutions. Population in 1910, 147,218.

**Helve'tii**, anciently a Gallic or Celtic nation, dwelling in the country corresponding nearly to modern Switzerland. They were not much known to the Romans until the time of Julius Caesar, who, as governor of Gaul, prevented their intended emigration and after many bloody battles pressed them back within their frontiers. After their subjection by Caesar, several Roman colonies were established among them. On the death of Nero, the Helvetii, for refusing to acknowledge Vitellius as emperor, were mercilessly punished by Caecina, one of his generals, and thenceforth they almost disappeared as a people.

**Hem'ans**, FELICIA DOROTHEA (1793-1835), an English poet. She first appeared as an author at the age of fifteen, with a volume entitled *Early Blossoms*, which was followed some years later by her more successful volume, *The Domestic Affections*. Other volumes of her poems are *The Forest Sanctuary*, in which appeared *Casabianca*, *Hymns for Childhood* and *Scenes and Hymns of Life*. Her poetry is essentially lyrical and is always sweet, natural and pleasing.

**Hem'atite**, a name applied to two ores of iron, red hematite and brown hematite. They are both of a fibrous structure, and the fibers, though sometimes nearly parallel, usually diverge or even radiate from a center. They occur in abundance in both igneous and stratified rocks. The red hematite is a variety of the red oxide and is one of the most important iron ores. The brown hematite is a variety of the brown oxide or hydrate; its streak and powder are always of a brownish yellow. See IRON.

**Hem'enway**, JAMES A. (1860- ), an American lawyer and politician, born at Boonville, Ind. He was admitted to the bar in 1885, and from 1895 to 1905 was a member of the House of Representatives. From 1905 to 1909 he was United States Senator from Indiana, filling the unexpired term of Vice-President Charles W. Fairbanks.

## Hemlock

**Hemip'tera**, a large family of insects, which includes those usually called bugs, known as most destructive to crops and as loathsome pests to humanity. Lice, bedbugs, chinch bugs and scale insects are all Hemiptera. The young do not resemble the parents very closely, but the metamorphosis is incomplete. The mouths of all these insects are adapted for sucking, and they live upon the blood of animals or the juices of plants. See INSECTS, and the special articles on various insects.

**Hemisphere**, *hem'is fer*, half a sphere, especially one of the halves into which the earth may be supposed to be divided. It is common to speak of the Eastern Hemisphere and the Western Hemisphere, the former, also called the Old World, comprising Europe, Asia, Africa and Australia, with their adjoining waters and islands; the latter including North America and South America. The boundary between the two is quite arbitrary, and a more natural division of the earth is into the Northern and the Southern hemispheres, the equator forming the dividing line. Some geographers also divide the earth into land and water hemispheres.

**Hemlock**, a poisonous biennial of the parsley family, which grows a shining, hollow stem, usually marked with purplish spots and elegant leaves, which are much divided and which, when bruised, give a nauseous odor. The flowers are small white clusters in large umbels. Hemlock grows in Great Britain and throughout Europe and in temperate Asia; it has long been known because of its medicinal and poisonous properties. It is supposed that the poison given to Socrates was a decoction of this plant, though it may have been the water hemlock which was used in this case. The hemlock grows in ditches and other moist places, seldom reaching a height of more than a foot. It now grows in many places in the United States.

**Hemlock** or **Hemlock Spruce**, a large, graceful tree, not unlike some of the spruces in appearance. The leaves, which are not more than half an inch long, are bright green above and silvery white below. They are not set so closely on the branches as are those of the spruces, and, consequently, they give a more graceful appearance to the twigs and branches. The cones are small and open. The wood of the hemlock is not especially valuable, but the bark is used in large quantities by tanneries. In recent years the deple-



## Hemp

tion of the pine forests has led to a greater use of hemlock lumber. The trees grow in forests



HEMLOCK SPRUCE

throughout the Northern United States, west as far as Minnesota and south to Alabama and Georgia.

**Hemp**, a plant belonging to the nettle family and extensively cultivated for the fibers found in its stalk. The plant has a coarse, rough stem, which grows to the height of from four to nine feet. The leaves are large and are composed of five or seven narrow, toothed leaves, each from three to five inches long. The stamens are borne on one plant, in large clusters of flowers near the top. The pistils, which are inconspicuous, are borne on another plant. The hemp fiber is tough, strong and peculiarly adapted for the manufacture of coarse fabrics, ropes and other forms of cordage.

After the ground is prepared, the seed is sown evenly over it, from one to two bushels to the acre being used. Care must be taken to spread the seed evenly or the plants will grow of different sizes, and from such a crop it is impossible to obtain good, even fibers. The plant is harvested and the fiber is prepared for market in practically the same way that flax is har-

## Henderson

vested and prepared (See FLAX), the difference being such as is due to the larger size and greater strength of the hemp plant. The fibers are long, soft and strong. They can be bleached as white as linen and woven into coarse fabrics, such as toweling and sheeting, carpets and rugs; but a large proportion of the fiber is employed in the manufacture of ropes and cordage.

Hemp is raised in large quantities in Russia, Brazil, Italy and several other tropical countries. Kentucky and some of the other Southern states of the United States raise small quan-



HEMP

Showing seed, seed vessel and flower.

tities, while the Philippine Islands are noted for the production of this plant, which forms one of their most important exports. A variety of hemp known as *Henequin* is extensively raised in Central America. See SISAL.

**Hemp**, INDIAN. See HASHISH

**Hen**. See FOWL.

**Hen'derson**, Ky., the county-seat of Henderson co., on the Ohio River, 10 mi. below Evansville, Ind., and on the Louisville & Nashville, the Illinois Central and other railroads. The city is a very important tobacco market. It also has a large trade in corn and wheat and contains tobacco factories, planing mills, coal mines and manufactories of cotton and woolen goods, hominy, furniture, wagons and other

## Henderson

articles. The place has large wealth, fine public school buildings and a well-equipped sanatorium. Other features of interest are the magnificent bridge across the river, the city fair grounds and Atkinson Park, covering 100 acres. Henderson was one of the first settlements on the Ohio River, but was not incorporated until 1797. Population in 1910, 11,452.

**Henderson, DAVID BREMNER** (1840–1906), an American legislator, born at Old Deer, Scotland. In his sixth year he came to America and was educated in the public schools of Iowa and in Upper Iowa University. When the Civil War broke out he enlisted as a private and became lieutenant of his company, but in 1863 he was discharged from the army on account of a severe wound. The following year, however, he reentered the army as colonel of an Iowa regiment. After the close of the war he studied law and was admitted to the bar at Dubuque, where he practiced for several years. In 1882 he was elected to the national House of Representatives; in 1894 he became chairman of the judiciary committee, and on the retirement of Thomas B. Reed he was chosen speaker of the House. He declined a renomination to Congress in 1902.

**Hendricks, THOMAS ANDREWS** (1819–1885), an American statesman, vice-president of the United States, born near Zanesville, Ohio. He was taken in infancy to Indiana, where he was educated in the public schools, was graduated at South Hanover College and was admitted to the bar. He served in the legislature, and he was in Congress from 1851 to 1855. He was elected to the Senate in 1863 and was pronounced in his support of the Union. In 1868 he was a candidate for the Democratic nomination for president; in 1872, Greeley having died, many electoral votes were given to Hendricks. In the same year he was elected governor of Indiana. In 1876 he was nominated by the Democratic party for the vice-presidency, was again a candidate in 1884, Cleveland being the candidate for president, and was elected.

**Hen Hawk** or **Chicken Hawk**, a name given to a number of different species of hawks, who either attack poultry or are supposed to do so. In some instances, for example, in the common marsh hawk, the name is very unjustly applied. The *red-tailed hawk* captures small poultry and birds, but they doubtless form a small part of this bird's food. The gophers, mice, frogs and many injurious small animals which are eaten by this hawk render it probably

## Henry

on the whole beneficial. The *red-shouldered hawk* never attacks poultry, although often accused of doing so. It does prey upon mice and other injurious animals and is really a good friend of the farmers. Some of the smaller hawks are called chicken hawks, and though they doubtless occasionally do some damage, yet they do not altogether deserve the dislike of poultry raisers.

**Henley Regat'ta**, a famous rowing contest held at Henley-on-Thames in the month of July of each year. It lasts for three days and is marked by a brilliant gathering from all parts of the United Kingdom and even from foreign lands. The races are open to all amateurs. The course is a little less than one mile and one-third in length and is rather narrow. Fine prizes are given to the winners. The Henley Regatta is the most famous rowing contest in the world.

**Hen'nepin, LOUIS** (about 1640–1706), a Belgian missionary and explorer in America. He accompanied La Salle's last expedition to the upper Great Lakes, but left him after the founding of Fort Crevecoeur on the Illinois River, and continued to the Mississippi with a few followers. There Hennepin was captured by the Sioux and taken to the head waters of the Mississippi River, or to about the site of the present city of Minneapolis. He returned to France, was again ordered to America, but refused to go and fled to Holland. After the death of La Salle he made extravagant claims of discovery and exploration which have been proved utterly false.

**Henry**, a frequent name of European monarchs. Among them may be mentioned Henry I (about 1008–1060), *king of France* (See also HENRY II; HENRY III; HENRY IV; of France); *Holy Roman emperors*, Henry I (See HENRY I, king of Germany), Henry II (about 973–1024), Henry V (1081–1125) and Henry VII (?–1313) (See also HENRY III; HENRY IV; HENRY VI; *Holy Roman emperors*). See also HENRY I; HENRY II; HENRY III; HENRY IV; HENRY V; HENRY VI; HENRY VII; HENRY VIII; of England.

**Henry I** (1068–1135), king of England, the youngest son of William the Conqueror. He was hunting with William Rufus when that prince was killed, in 1100, and instantly riding to London, he caused himself to be proclaimed king in the absence of his elder brother Robert, duke of Normandy. He reestablished by charter the laws of Edward the Confessor and married Matilda, daughter of Malcolm III of Scotland,



## Henry

thus conciliating the Scots. Robert landed with an army, but was pacified with a pension and the promise of succession in event of his brother's decease. Soon after, however, Henry invaded Normandy, took Robert prisoner and reduced the duchy. He was successful also in a struggle with France. The last years of his reign were troubled. In 1120, his only son, William, was drowned. Three years later, a revolt occurred in Normandy in favor of Robert's son. The Welsh also were a source of disturbance. Henry appointed as his heir his daughter Matilda, or Maud, whom he had married first to the emperor Henry V and then to Geoffrey Plantagenet of Anjou.

**Henry II** (1133-1189), king of England, the first of the Plantagenet line, the son of Geoffrey, count of Anjou, and Matilda, daughter of Henry I. He succeeded Stephen. The opening of his reign was marked by the reduction of the powerful nobles and the reorganization of the financial system. The most important events of his reign were the submission of the Church to the temporal authority of the Crown, through the Constitutions of Clarendon, the famous struggle with and murder of Thomas à Becket, resulting in the restoration of some ecclesiastical rights; the conquest of Ireland; the first subjugation of Scotland by England, and the division of England into four judicial districts, with itinerant justices appointed to make regular excursions through them. Henry ranked among the greatest of English kings, his chief services to his people being the revival of trial by jury, the construction of roads and the destruction of castles of lawless barons. Henry's sons greatly disturbed the latter part of his reign with their insurrections.

**Henry III** (1207-1272), king of England, son of John, whom he succeeded in 1216. As Henry approached manhood he displayed a character wholly unfit for his station and a weakness which proved the opportunity of the great barons of the country. These, under Simon de Montfort, revolted and succeeded in forcing Henry, by the Provisions of Oxford, to resign the chief power to a committee of the barons. In later years, Edward, son of the king, defeated the barons and freed his father from his early humiliating promises. Parliament, in its modern sense of two houses, was first called during this reign.

**Henry IV** (1367-1413), king of England, first king of the House of Lancaster, the eldest son of John of Gaunt, fourth son of Edward III. He ascended the throne in 1399 on the abdication

## Henry

of Richard II. The first six years of his reign were filled with a series of insurrections, which were finally quelled, and the rest of the reign was comparatively untroubled. The first persecutions of the Lollards occurred during the rule of Henry IV.

**Henry V** (1387-1422), king of England. On succeeding his father, Henry IV, in 1413, he showed a wisdom in marked contrast to a somewhat reckless youth. The struggle in France between the factions of the dukes of Orleans and Burgundy afforded Henry a tempting opportunity for reviving the claims of his predecessors to the French crown. He accordingly landed near Harfleur in August, 1415 and though its capture cost him more than half his army, he decided to return to England by way of Calais. A large French army endeavored to intercept him at the plain of Agincourt, but was completely routed (October, 1415). He returned in triumph to England, but on the defeat of his brother, the duke of Clarence, in Normandy, he again set out for France, drove back the army of the dauphin and entered Paris, forcing Charles VI to accept him as his successor to the French crown. A son was at this time born to him, and all his great projects seemed about to be realized, when he died of fever at Vincennes.

**Henry VI** (1421-1471), king of England, became king on the death of his father, Henry V, in 1422. As he was an infant, his uncle John, duke of Bedford, was appointed regent of France; and his uncle Humphrey, duke of Gloucester, was made protector of England. A few weeks after Henry's succession Charles VI of France died, and in accordance with the Treaty of Troyes, Henry was proclaimed king of France. The war which followed proved at first favorable to the English, but in the end, through the heroism of Joan of Arc, the death of the duke of Bedford and the defection of the duke of Burgundy, it resulted in the loss to the English of all their possessions in France, except Calais. In April, 1445, Henry married Margaret of Anjou, daughter of René of Provence, and the marriage was very unpopular in England. Other causes increased this unpopularity, and various risings ensued, which led in 1455 to the opening of the Wars of the Roses (See **ROSES, WARS OF THE**). During the struggle Henry was several times taken prisoner by the Yorkists, and in 1471 he was found dead in the Tower, murdered, according to popular belief, by order of Edward IV. Henry was a gentle, pious, well-intentioned, hopelessly incompetent king.

## Henry

**Henry VII** (1456–1509), king of England, first sovereign of the race of Tudor. He was proclaimed king in 1485, after the defeat and death of Richard III at Bosworth. His reign was troubled by repeated insurrections, of which the chief were headed by Lord Lovel and the Staffords, and by the impostures of Lambert Simnel and Perkins Warbeck. In the main, however, the period was beneficial to England. Its freedom from wars permitted the development of the internal resources of the country, and Henry's policy of curbing the power of the feudal nobility was highly salutary.

**Henry VIII** (1491–1547), king of England, succeeded his father, Henry VII, in 1509. After the election of Charles V to the German Empire both Charles and the French king, Francis I, sought the alliance of England. A friendly meet-



HENRY VIII

ing took place between Henry and Francis at the "Field of the Cloth of Gold" (1520), but the interest of Charles preponderated. Henry withdrew from the struggle between France and the emperor, however, when he found that he was being used as a tool. Meanwhile came the determination of the king to divorce his wife Catharine, who was older than he, had borne him no male heir and had, moreover, been in the first place the wife of his elder brother. The last of these points was the alleged ground for seeking divorce, though Henry was probably influenced largely by his attachment to Anne Boleyn, one of the queen's maids of honor. The pope refused to grant a divorce, and Henry eagerly caught at the advice of Thomas Cranmer, afterward archbishop of Canterbury, to refer the case

## Henry

to the universities, from which he soon got the decision that he desired. In 1533 his marriage with Catharine was declared null, and an amicitary private marriage with Anne Boleyn declared lawful; and as these decisions were not recognized by the pope, two acts of Parliament were obtained, one in 1534 setting aside the authority of the chief pontiff in England, the other in 1535, declaring Henry the supreme head of the Church. Henry suppressed the monasteries by act of Parliament, and thereby inflicted an incurable wound upon the Catholic religion in England. It was far from being his intention, however, to advance the cause of Protestantism in England, and he insisted on firm adherence to the tenets of the Roman Catholic Church.

Henry then married Jane Seymour, and the birth of Prince Edward, in 1537, fulfilled his wish for a male heir. The death of the queen was followed by Henry's marriage with Anne of Cleves, the negotiations for which were conducted by Cromwell. The king's dislike for his wife, which resulted in another divorce, was extended to the minister who had proposed the union, and Cromwell's disgrace and death soon followed. A marriage with Catharine Howard proved no happier, and she was executed on a charge of infidelity. In 1543 Henry married his sixth wife, Catharine Parr, a lady secretly inclined to the Reformation, who survived the king. In the meantime Scotland and France had renewed their alliance, and England became again involved in war. James V ravaged the borders, but was defeated at Solway Moss in 1542, and in 1544 Boulogne was captured, Henry having again allied himself with Charles V. Charles, however, soon withdrew, and Henry maintained the war alone until 1546. Henry died in 1547 and was succeeded by his son, Edward VI.

**Henry III** (1551–1589), king of France, third son of Henry II and Catharine de' Medici, came to the throne on the death of his brother, Charles IX, in 1574. The war against the Huguenots, which had been begun in the previous reign, continued under Henry III, who was at length forced to grant to the Protestant party certain concessions. This led to the formation of a Catholic League, in response to whose demand Henry repealed the special privileges of the Huguenots, thus bringing on another war. The Huguenots, under Henry of Navarre, were successful, and to their camp Henry III fled, after he had made himself unpopular with the Catholic party by his murder of the duke of Guise and the cardinal of



## Henry

Lorraine, the Catholic leaders. In 1789 Henry III was murdered, and Henry of Navarre came to the throne as Henry IV.

**Henry IV** (1553-1610), king of France, better known as Henry of Navarre, the son of Anthony of Bourbon, duke of Vendôme, and of Jeanne d'Albret, queen of Navarre. Educated by his mother in the Calvinistic faith, he early joined, at her wish, the Protestant army of France and served under Admiral Coligny. In 1572 he married Margaret of Valois, sister of Charles IX, and after the massacre of Saint Bartholomew's Day, which took place during the marriage festivities, he was forced to adopt the Catholic creed. In 1576 he escaped from Paris, retracted at Tours his enforced statement of Catholicism, put himself at the head of the Huguenots and took a leading part in all the subsequent religious wars. On becoming presumptive heir to the crown, through the death of the brother of Henry III, he was obliged to resort to arms to assert his claims. In 1587 he defeated the army of the League at Coutras, and after the death of Henry III in 1589, he gained the battles of Arques and Ivry. He was obliged, however, to raise the siege of Paris; and convinced that a peaceful occupation of the throne was impossible without his professing the Catholic faith, he became nominally a Catholic in 1593.

After his formal coronation in 1594 only three provinces held out against him—Burgundy, reduced by the victory of Fontaine-Francaise in 1595; Picardy, reduced by the capture of Amiens in 1596, and Brittany, which came into his hands in the spring of 1598. The war against Spain was concluded in 1598 by the Peace of Vervins, to the advantage of France. The same year was signalized by the granting of the Edict of Nantes, which secured to the Protestants religious liberty. Henry made use of the tranquillity which followed to restore the internal prosperity of his kingdom, and particularly the wasted finances, in which he was aided by his prime minister, Sully. At the instance of Sully, Henry divorced Margaret of Valois, and in 1600 he married Maria de' Medici, niece of the grand duke of Tuscany, mother of Louis XIII. She was crowned in 1610, but on the day following her coronation Henry was stabbed by a fanatic named Ravallae, while examining the preparations for the queen's entry into Paris. The great benefits which Henry IV bestowed upon France entitled him to the designation which he himself assumed—the Regenerator of France.

## Henry

**Henry III** (1017-1056), Holy Roman emperor, became king of Germany on the death of his father in 1039 and succeeded to the imperial dignity in 1046. He strengthened his power by forcing Hungary, Bohemia and Apulia to render him homage, and in 1046 he deposed the pope and appointed a new one. From this time to the end of his reign his influence was strong in all Church matters. He was one of the most powerful of the early emperors.

**Henry IV** (1050-1106), Holy Roman emperor, came to the throne on the death of his father, Henry III, in 1056. After some years of regency, Henry assumed the rule himself and found that much of the power in the kingdom had been usurped by the nobility and the Church. A formidable revolt of the Saxons was put down in 1073, and Henry was able to give his attention to a struggle with the pope. The two came into conflict owing to a decree promulgated in 1075 forbidding civil rulers to appoint to any ecclesiastical office, a decree which Henry refused to obey. The result was that Henry called a council and deposed the pope, and was in turn excommunicated. The pope released Henry's subjects from their allegiance, and this forced Henry to the point of making peace with the pope after most humiliating concessions. In 1080 the pope again excommunicated Henry, who laid siege to Rome and appointed an anti-pope. A short time afterward he was driven out of Italy. In 1105 he was compelled by his nobles to abdicate.

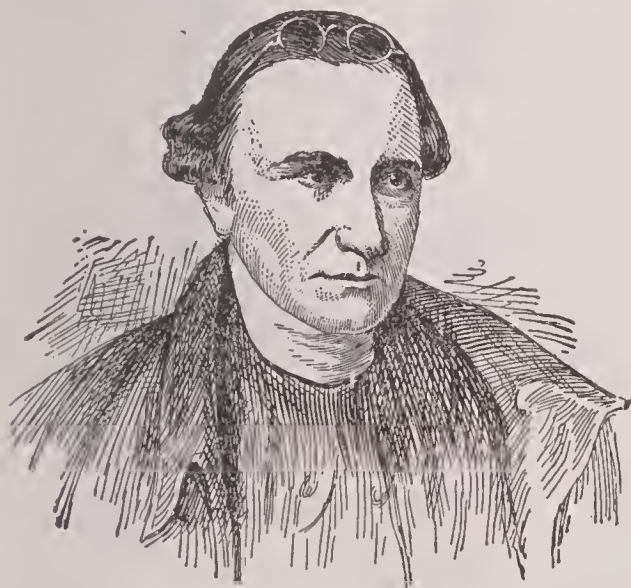
**Henry VI** (1165-1197), Holy Roman emperor, son of Frederick Barbarossa. He served as regent while his father was in the Holy Land, and in 1190 he succeeded to the crown on his father's death. Through his wife he laid claim to the throne of Sicily, and this involved him during much of his reign in wars in Italy. When Richard I of England was captured, on his return from the Holy Land, it was to Henry that he was handed over for safe keeping. Among the early emperors of Germany Henry ranks as one of the strongest.

**Henry, JOSEPH** (1799-1878), an American scientist, born at Albany, N. Y., and educated in the Albany Academy. At an early age he began a series of experiments in electricity and was the first to construct an electro-magnetic telegraph, which as a sounding telegraph has never been improved. He also invented the first machine moved by electro-magnetic force. In 1831 he sent signals over wire more than a mile in length and showed in this and other

## Henry

experiments the practical use of the telegraph, several years before this invention was made public by Samuel Morse. The next year Henry was chosen professor of natural history in the College of New Jersey and held that position for fourteen years, when he became the first secretary and manager of the Smithsonian Institution. The usefulness and greatness of that institution are to a large extent due to Professor Henry (See SMITHSONIAN INSTITUTION.) Among his publications, most of which are in the form of articles in scientific periodicals, is one of especial value, *Contributions to Electricity and Magnetism*. His works are published in the *Smithsonian Miscellaneous Collection*.

**Henry, PATRICK** (1736–1799), an American orator and patriot, born in Virginia. Henry received a brief classical education, but at an early age entered business and married at eighteen. Having failed successively in “store-keeping” and in farming, he became a lawyer in



PATRICK HENRY

1760, and three years later, having been employed to plead the cause of the people against an unpopular royal enactment (See PARSON'S CAUSE), his great eloquence placed him at once in the front rank of American orators. His bold and unfaltering opposition to the Stamp Act and the policy which it expressed, during which he is said to have uttered the famous words, “Give me liberty or give me death,” led to his election as delegate to the First Continental Congress. He delivered the first speech in that assembly, and it was worthy of so momentous a meeting. In 1776 he carried the vote of the Virginia convention for independence; and in the same year he became governor of the new state. He was afterward four times reelected. In 1791

## Hepatica

he retired from public life and in 1795 declined the office of secretary of state, offered him by Washington. Henry was rather eloquent than deep; no one who has come after him has been able to stir and sway the passions of an audience as easily as he; yet he was not a statesman of broad views or of especial foresight.

**Henry the Navigator** (1394–1460), son of John I of Portugal. From time to time he sent vessels on voyages to the coasts of Barbary and Guinea, and one of these voyages resulted in the discovery of the Madeira Islands. In 1433 one of his navigators safely doubled Cape Bojador, and other adventurers, pushing still farther south, discovered Cape Blanco and Cape Verde. A profitable commerce with the natives of West Africa was soon developed, and the Senegal and Gambia were partially explored. Henry's efforts not only laid the foundations of the commerce and colonial possessions of Portugal, but gave a new direction to navigation and commercial enterprises.

**Henschel, hen'shel, GEORG** (1850– ), a German-English musical composer and singer, born at Breslau, of musical parentage. He entered Leipzig Conservatory in 1867 and later studied in Berlin. He soon established a reputation as a singer and was chosen to take one of the principal rôles in Gluck's opera *Iphigenia en Tauride*. He went to England in 1877 and settled in London, where he soon attained fame as a teacher. In 1881 he married a young American soprano, Miss Lilian Bailey. For three years thereafter he conducted the Boston Symphony Orchestra. He composed several songs, operas and orchestral pieces, of which the most important is the *Stabat Mater*.

**Henty, GEORGE ALFRED** (1832–1902), a writer of juvenile fiction. He received his education at Cambridge and engaged in newspaper correspondence for the London *Standard* during the Austro-Italian and the Franco-German wars. The stirring quality and wholesome interest of his best stories have won for him unusual popularity with boys. Among his best known works are *Under Drake's Flag*, *The Lion of the North*, *By Pike and Dyke*, *With Lee in Virginia* and *In Freedom's Cause*.

**Hepatica**, a beautiful little flower that blossoms in earliest spring. The hairy stalks rise from the midst of the leathery, dark-colored, three-lobed leaves, that have lain on the ground during the winter. The flowers, which are related to the buttercups, vary in color from white to red and purple. The hepatica is sometimes known as the liverleaf or liverwort.



## Heptarchy

**Hep'tarchy**, the name given to the seven kingdoms into which England is supposed to have been divided in Anglo-Saxon times. The kingdoms were founded at different times, and at no one time were they all independent monarchies. In 827 King Egbert of Wessex united all the kingdoms into one and assumed the title of king of England.

**He'ra.** See JUNO.

**Her'aldry**, the whole science of a herald's duties, or, more commonly, the knowledge of the forms, terms and laws which pertain to the use of armorial bearings or coats of arms. Badges and emblems on shields, helms and banners naturally were used in the earliest times, and the symbols were sometimes hereditary. The origin of heraldic arms is, however, to be attributed to the necessity which arose during the Crusades of distinguishing the leaders of the numerous and motley bands of warriors that constituted the Christian armies. The rules of heraldry now practiced at the Heralds' College are comparatively modern and differ in some respects from those of other European courts. A coat of arms consists of the figure of a shield, marked and colored in a variety of ways, so as to be distinctive of an individual, a family or a community. The shield, or escutcheon, represents the original shield used in war, on which arms were anciently borne.

**Herat**, *her aht'*, a city in the northwest of Afghanistan, the capital of a province of the same name, about 370 mi. w. of Cabul. The most important manufactures are carpets, sword blades, shoes, cloaks and sheepskin caps. The trade, almost entirely in the hands of Hindus, is greatly favored by the situation of the town on the great thoroughfare from India westward. Herat was probably founded by Alexander the Great, and since that time, besides being occasionally independent, it has been under the control of the Arabs, the Persians and the Afghans at different times. Population, about 45,000; it was formerly much greater.

**Herba'rium**, a collection of dried plants, arranged in order, according to a recognized system of classification. The plants are usually mounted on sheets of white paper, and a good specimen shows the leaf, root, flower and fruit. In the United States there are three great collections, besides numerous smaller ones in several colleges and museums. The United States national herbarium, which is in the National Museum; the herbarium of the New York Botanical Garden, and the Gray Herbarium in

## Herbart

Harvard University are the largest collections, each rich in its own peculiar way. In the herbarium of the Jardin des Plantes of Paris, there are a great many of the type specimens from which our American plants were named.

**Herbart**, *her'bahrt*, JOHANN FRIEDRICH (1776-1841), a German philosopher, born in Oldenburg and educated at the University of Jena, where he was a pupil of Fichte. Herbart early manifested an interest in philosophy, and while a student at Jena he became an ardent follower of Fichte, though later he rejected the system of his instructor and formulated one of his own. He became connected with the University of Göttingen, where, with the exception of a few years spent at Königsberg, he remained during his life.



JOHANN FRIEDRICH HERBART

According to Herbart, all ideas originate from what he styled *monads* or *reals*, which he considered as metaphysical atoms. These he believed were back of the world of known phenomena, of which they were the active metaphysical cause. These reals were simple in quality, possessed the power of self-preservation against all disturbances from other reals and were capable of creating disturbances in one another. The soul is one of these reals, its seat is in the brain and it is in close relation with a multitude of other reals. Whenever an excitation upon the remote end of nerves leading to the brain is made, the nerves convey this impression, and it reaches the soul through the medium of the reals

## Herbert

most closely related to it. According to this idea the soul of itself is incapable of development; ideas arise only from interaction or conflict with these reals. When they become prominent, they are in consciousness, but it is impossible for the soul to have all the ideas it contains in consciousness at any one time. The prominence of ideas depends upon their ability to assist or contradict one another.

Herbart's educational principles are based directly upon his philosophy and psychology. He believed that all subjects were related and that the knowledge of one strengthened the knowledge of all others. He was also the originator of the doctrine of apperception (See APPERCEPTION). His entire system of pedagogics leads to the idea that the end and aim of education is the development of the individual, whom he places above family or state in his system. Herbart is the founder of modern pedagogics, and his psychology and pedagogy have exerted a powerful influence in modifying the methods of instruction and courses of study in Germany, England and the United States. His pedagogical works have been translated into English, and the most useful of them are easily obtained. Consult De Garmo's *The Psychology of Herbart* and *Herbart and the Herbartians*.

**Herbert**, VICTOR (1859- ), an Irish-American musician, born at Dublin, Ireland; the grandson of Samuel Lover, a famous novelist. At seven years of age he began the study of music in Germany and eventually became an excellent performer upon the 'cello, securing an engagement as first 'cellist of the court orchestra at Stuttgart. In 1886 he accepted a similar position with the Metropolitan Orchestra of New York. He was chosen the successor of Gilmore as leader of the famous Twenty-second Regiment band and later accepted the conductorship of the Pittsburg Orchestra. He is the author of numerous songs and pieces for the piano and orchestra, besides several well-known comic operas, of which the best are *The Ameer*, *The Idol's Eye*, *The Fortune Teller*, *The Singing Girl*, *Babette*, *Babes in Toyland* and *It Happened in Nordland*.

**Herbicides**, *hur'bi sidez*, the name given to any preparation for destroying weeds. Among the herbicides most commonly used, and apparently with greatest success, are solutions of carbolic acid, copper sulphate, arsenic, sal soda, kerosene and salt. The amount of the preparation to be used depends upon the conditions and habits of growth of the weeds. Recent bulletins of the department of agriculture at Washington

## Hercules

give full information as to the best methods of eradicating weeds.

**Herbs**, *urbz* or *hurbz*, plants that contain no woody tissue. They usually die down to the ground at the end of their growing season. Many of them are used in the preparation of foods and medicines, especially for spices. Among the best known are parsley, sage, thyme, marjoram and caraway.

**Her'cula'neum**, an ancient city, about 5 mi. s. e. of Naples, at the base of Mount Vesuvius. It was completely buried, with Pompeii, Stabiae and other villages, by lava and ashes during an eruption of Vesuvius in the reign of the Roman emperor Titus, 79 A. D. The site had been long sought in vain, when, early in the eighteenth century (1709, 1713 or 1718), statues were found in the digging of a well at the village of Portici. In 1738 the well was dug deeper, and traces of the theater of Herculaneum were found. Later explorations have disclosed wonderful examples of ancient art, far excelling those found at Pompeii.

**Hercules**, *hur'ku leez*, the most celebrated among the Greek heroes or semi-divine persons,



HERCULES AND THE NEMEAN LION

He was the son of Jupiter by Alcmene, a mortal princess, and was brought up at Thebes at the court of his step-father. Juno, hating him because of Jupiter's love for his mother, troubled him throughout his career with all the disasters she could invent. When he was but eight months old, she sent two gigantic serpents to devour him, but the child, stretching out his hands, grasped them by the neck and strangled them both. When he grew to manhood he married and settled down to a happy life. Juno, however, determined that he should know no peace and afflicted



## Hercules

him with madness, so that he killed his three children and wandered forth as an outcast. As a purification for his crime he was condemned to serve his cousin Eurystheus and to perform any tasks which might be laid upon him. The tasks which he accomplished were what are known as the Twelve Labors of Hercules. They were (1) to kill a lion which ravaged Nemea; (2) to destroy the hydra (See HYDRA); (3) to capture alive and unhurt a stag, famous for its incredible swiftness, its golden horns and brazen feet. In this he succeeded only by driving the animal into a far northern snowdrift from which it could not extricate itself; (4) to capture alive a furious wild boar; (5) to clean the stables of Augeas (See AUGEAS); (6) to kill the savage birds which troubled the country near the lake Stymphalus in Acadia and ate human flesh; (7) to bring alive to Eurystheus a prodigious wild bull which laid waste the island of Crete; (8) to obtain the mares of Diomedes (See DIOMEDES); (9) to procure for the daughter of Eurystheus the girdle which had been given by Mars to the queen of the Amazons; (10) to kill the monster Geryon and bring to Eurystheus his numerous flocks; (11) to obtain three golden apples from the garden of the Hesperides (See HESPERIDES); (12) most dangerous of all, to bring up from Hades Pluto's dog, Cerberus. All of these tasks he performed, besides many others which he met with while on his enforced journeys. After his release from Eurystheus he came into conflict with Apollo and was by him condemned to serve as a slave to Omphale, queen of Lydia. The occupations of Hercules during this period were exceedingly effeminate. In female garb he worked at spinning, while his mistress clad herself in his lion's skin and brandished his famous club. Released from the Lydian queen, he again set out in search of adventures; having married Deianira, he was now no longer alone in his wanderings. One day Hercules and Deianira came to a rapid stream. The centaur Nessus offered to carry Deianira across, but when he reached the opposite shore, instead of setting her down he galloped off with her. Hercules therefore shot him with one of his poisoned arrows, and Nessus, with his dying breath, bade Deianira to dip in his blood a robe of Hercules, which should serve, if ever his love wandered from her, to bring him back. When sometime later she became jealous of Iole, she innocently sent Hercules the robe. Its effect, however, was most agonizing, and all attempts of Hercules to tear it off were in vain. As the only way of stopping the

## Heretic

pain, he had a huge funeral pile built, on which he laid himself. This was set on fire, but while the mortal part of the hero was consumed, Jupiter took the immortal part to Olympus, and there Hercules lived with the gods as the husband of Hebe.

**Hercules**, **PILLARS OF**, the ancient name for the rocks projecting into the sea on either side of the Strait of Gibraltar at its narrowest point. See GIBRALTAR.

**Hercules Beetle**, an enormous beetle, about five inches in length, found in Brazil. Its great peculiarity consists in the exceedingly long, curving horn which projects from the upper part of the head of the male, and the shorter one from the lower part of the head, which curves upward to meet it.

**Hered'ity**, the transmission from parent to offspring of physical and intellectual characteristics. The term is used in a very broad sense and applies to both plants and animals, though the greatest interest is attached, naturally, to heredity in human beings. Darwin, Spencer and Wallace have studied the subject thoroughly and embodied their discoveries in doctrines which, though at first received with skepticism, are now generally believed. It is known that heredity manifests itself in different ways. For instance, the qualities of the parents may blend in the children; they may alternate in the children; the qualities of one parent only may be transmitted to a child, or the inherited qualities may come from an ancestor—not the immediate parent. Both mental and physical characteristics are transmitted, but they do not necessarily manifest themselves in infancy; in fact, many hereditary traits come only with increasing age. To how great an extent an individual is governed by hereditary traits is still a question of discussion among scientists.

**Her'esy**. See HERETIC.

**Her'etic**, one who holds some theological doctrine that conflicts with the beliefs of the church to which he belongs, but who, at the same time, calls himself a Christian. Many of the early Christians preserved their Jewish or Greek philosophical notions and mingled them with the doctrines of Christianity. Even in the time of the apostles there are traces of the Gnostics; and subsequently a great variety of heretical sects arose. Among religionists stigmatized as heretics in later times by the Roman Catholic Church were the Waldenses, the Wycliffites, the Hussites, the Lutherans and all Protestant sects and churches. Before Chris-

## Herkimer

tianity was made the religion of the Roman state, nothing but excommunication was inflicted upon the heretic; but severe laws were passed soon after the conversion of the emperors. The code of Justinian contains many ordinances against heretics, and the canon law made it a duty to denounce them under pain of excommunication. Spain, Italy and France, from the thirteenth to the sixteenth centuries, suffered much from the persecution of heretics, but the states of Germany showed greater moderation. In England the burning of heretics was practiced before 1200 and continued for a long period. Heresy is now left entirely to the decision of the ecclesiastical authorities, and punishment can extend to excommunication only.

**Herkimer**, *hur'kim ur*, N. Y., the county-seat of Herkimer co., about 25 mi. e. of Utica, on the Mohawk River and the Erie Canal and on the New York Central railroad. The village is in a dairying region; its industries include the manufacture of knit goods, furniture, paper, beds, cigars and other articles. It is the seat of Folts Mission Institute. Population in 1910, 7520.

**Herkimer**, **NICHOLAS** (1715–1777), an American revolutionary soldier, born in Herkimer County, N. Y. At the outbreak of the Revolutionary War he was made colonel of militia, was promoted to be brigadier general and commanded an expedition against the Tory-indian forces of western New York. In 1777 with 800 men he marched to relieve Fort Stanwix, which was besieged by Saint Leger, with an English force, and Sir John Johnson with a Tory-indian force. When about six miles from the fort, Herkimer was ambushed, but after a desperate hand to hand conflict, known as the Battle of Oriskany, he compelled the British to retreat, with probably a loss of one-half the total force engaged. The American loss was one-third. Herkimer was mortally wounded.

**Hermes**, *hur'meez*. See MERCURY.

**Hermit Crab**, *hur'mit krab'*, a name common to a family of well-known crustaceans. These crabs take possession of and occupy the cast-off shells of various mollusks. The crab carries its habitation about with it. The shell is changed for a larger one as the crab increases in size, and the crab attaches itself so firmly to the inside of the shell, by means of small hook-like append-

## Hernia

ages, that it is impossible to draw it out without tearing its body. There are several species of various sizes, chiefly belonging to tropical shores.

**Hermits** are those who in early ages withdrew from association with man and took up their



HERMIT CRAB

abode in caverns or poorly made huts, in order to avoid the cares, temptations and business of the world. They often lived in complete solitude. The first hermit is said to have been Paul of the Thebaid, who fled to the desert after persecution by Decius and lived alone for ninety years, till his death, about 342. The hermits of the early church lived in a community, but each had a separate hermitage, and they met only at certain times for religious exercises.

**Hermon**, *hur'mon*, a mountain of Syria, on the border of Palestine, belonging to the Anti-Lebanon range. It is about 9400 feet high. The lower slopes are covered with vegetation, and the summit is usually crowned with snow throughout the year.

**Hermosillo** *air'mo see'lyo*, a city of Mexico, the capital of the State of Sonora. It is situated on the river Sonora, 90 miles north of the port of Guaymas, with which it has a large traffic. It has a mint, distilleries and flour mills. Population in 1910, 14,500.

**Herne**, **JAMES A.** (1840–1901), an American actor and author, born in Troy, N. Y. He made his stage debut at the age of nineteen, in his native city, in *Uncle Tom's Cabin*. His first original play was *Hearts of Oak*, which appeared in 1878. His greatest success was *Shore Acres*, as produced at the Boston Museum in 1892. It achieved instant popularity and brought its author fame.

**Hernia**, *hur'ne ah*, or **Rupture**, in surgery, a tumor, formed by the protrusion of parts of any organ by a natural or accidental opening from



## Hero

the cavity in which it is contained. The brain, the heart, the lungs and most of the abdominal viscera may become totally or partially displaced and thus give rise to the formation of hernial tumors. The term is ordinarily applied to abdominal hernia, which may arise from violent strain, as in jumping or lifting. Various forms of abdominal hernia are recognized, and each has its peculiar method of treatment. The wearing of a truss or support to hold the organ in its natural position is a common and safe remedy for the less severe cases.

**He'ro**, a priestess of Venus at Sestos, on the coast of Thrace, for love of whom Leander, a youth of Abydos, swam every night across the Hellespont, guided by a torch in her tower. He was at length drowned in the attempt, and his body was washed ashore. Hero, overcome with anguish, threw herself from the tower on the corpse of her lover and perished.

**Her'od**, called *The Great*, (about 62-4 B. C.), king of the Jews, was a native of Ascalon, in Judea. Julius Caesar appointed Herod to the government of Galilee, and after the Battle of Actium, Augustus, to whom he paid court, confirmed him in his kingdom. He rebuilt the Temple at Jerusalem with great magnificence and erected a stately theater and amphitheater in that city. Herod's policy and influence gave a great temporary splendor to the Jewish nation, but he was also the first to shake the foundation of the Jewish government, by dissolving the national council and by appointing the high priests and removing them without regard to the laws of succession. The birth of Jesus Christ is said to have taken place in the last year of Herod's reign.

**Herod Agrip'pa I**, a king of Judea, grandson of Herod the Great. For his attachment to Caligula he was imprisoned by Tiberius, but on the accession of Caligula (37 A. D.) he received the government of part of Palestine and latterly all the dominions of Herod the Great. To please the Jews, with whom his rule was very popular, he caused Saint James to be put to death and imprisoned Saint Peter. He died in 44 A. D., under the circumstances related in *Acts* XII, 20-23.

**Herod Agrippa II**, son of Herod Agrippa I and the last of the Herodian line. As he was, on his father's death, too young to govern, Judea was reduced to a Roman province. He subsequently received the kingdom of Chalcis and the superintendency of the Temple at Jerusalem, where, with his sister Berenice, he heard the defense of Paul before Festus. Being driven from Jerusalem by the revolt of the Jews, he joined the Ro-

## Heron

mans and during the siege of Jerusalem was very serviceable to Titus.

**Herod An'tipas**, son of Herod the Great, by his Samaritan wife, Malthace, was appointed tetrarch of Galilee on his father's death, about 4 B. C. This was the Herod who put to death Saint John the Baptist, at the request of his unlawful wife, Herodias. He was in Jerusalem at the time of the crucifixion, and Jesus was sent to him by Pilate. Herod went to Rome, where he was accused of being in league with the Parthians and was banished, in consequence, to Lyons, in Gaul, where he died in 39 A. D.

**Herod'otus** (about 484-about 424 B. C.), the oldest Greek historian whose works have come down to us, the "father of history," was born at Halicarnassus, in Asia Minor. Before writing his history he traveled extensively, visiting the shores of the Hellespont and the Euxine, Scythia, Syria, Palestine, Babylon and Ecbatana, Egypt as far as Elephantine and other parts of northern Africa, everywhere investigating the manners, customs and religion of the people, the history of the country and the productions of the soil. On returning home he found that Lygdamis had usurped the supreme authority in Halicarnassus and had put to death the noblest citizens, among others, the uncle of Herodotus. Herodotus sought an asylum in the island of Samos. Having formed a conspiracy with several exiles he returned to Halicarnassus and drove out the usurper, but the nobles who had acted with him immediately formed an aristocracy more oppressive than the government of the banished tyrant, and Herodotus withdrew to Athens. Later he went to the recently founded colony of Thurii in Italy, where he seems to have spent most of the remainder of his life. Here he completed his great history of the contest of Greece with the East, culminating in the defeat of Xerxes.

**Her'on**, the common name for the group of graceful wading birds which live in swamps and along shallow rivers. They are very numerous, and different species are found almost all over the globe. They are easily distinguished by their long bills, cleft beneath the eyes; their slender, compressed bodies; their long, slender, naked legs; three toes in front, the two outer united by a membrane, and by their moderately long wings. Their tails are short, rounded and compressed. With their powerful necks and sharp, strong beaks, herons are able to strike fierce blows. Many of the species have long, ornamental crests and handsome plumes on the throat and body. Though not handsome in flight, because of their

## Heron of Alexandria

habit of stretching their long legs straight out behind them and curling their heads between their shoulders, they are really graceful and elegant in their movements on land. The *snowy heron*, living along the Gulf of Mexico, but some-



SNOWY HERON

times straying farther north, is a handsome bird with pure white plumage and black legs and bill. The *great blue heron* is common in the United States, where it is noticed as a very shy bird which nests even to the extreme north. See BITTERN; EGRET; NIGHTHAWK; STORK.

**Heron of Alexandria.** See HERO OF ALEXANDRIA.

**Hero of Alexandria** or **Heron of Alexandria**, a Greek mathematician and physicist, the dates of whose birth and death are unknown. It is probable that he lived in the first or second century B. C. His work is not much more definitely known than are the facts of his life, but it seems probable that he wrote at least thirteen works, which dealt with different phases of mathematics and physics. It is also believed that he invented several mechanical devices, among which is the fountain which bears his name.

**Herrera**, *air ra'rah*, FRANCESCO (1576-1656), one of the greatest painters of the Seville school. He was born at Seville and studied under Fernandez, who painted in the Italian style. But Herrera early freed himself from this influence and adopted a style of his own. He designed with great spirit and vigor and may justly be regarded as the founder of a new national school of Spain. His subjects are of a religious nature and are usually somber and severe. His *Last*

## Herring

*Judgment* is a masterpiece of design and coloring. Equal praise is due to his *Holy Family* and the *Outpouring of the Holy Spirit*. He also displayed much skill in fresco painting.

**Herrick**, ROBERT (1591-1674), an English poet, educated at Cambridge. He was given the vicarage of Dean Prior in Devonshire, but in 1647 was forced by the Long Parliament to give it up. The first collections of his poems, *Hesperides* and *Noble Numbers*, appeared in 1648. After the Restoration he was given his old living, where he remained until he died. Herrick's poems, which are rhythmical and full of fancy, were highly praised on their publication, but for over a century after his death little attention was shown them. From the early nineteenth century, their popularity has been increasing. Among the most famous of his poems are *Gather ye rosebuds while ye may* and *Cherry Ripe*.

**Herrick**, ROBERT WELCH (1868- ), an American author, born in Massachusetts. He was graduated from Harvard University, taught English in the Massachusetts Institute of Technology and later became professor of rhetoric in the University of Chicago. The scenes of many of his novels, among which are *The Web of Life*, *The Real World*, *The Common Lot*, *Memoirs of an American Citizen* and *One Woman's Life*, are laid in Chicago. Among his other novels are *Together*, *A Life for a Life* and *The Healer*.

**Herring**, a family of sea fishes, the most important of which is the common herring. It is of wide distribution in the North Atlantic, extending as far south as 45° north latitude.



HERRING

The herring measures from ten to twelve inches in length. It is blue-green on the back and its under parts are of a brilliant silvery white. It has small teeth in both jaws, and is of an elegant shape, the body being much compressed. It was formerly supposed that herrings migrated in two great shoals every summer from the polar seas to the coasts of Europe and America, returning in the winter, but the migration is probably only from a deeper part of the ocean to a shallower. The feeding ground of the herring is probably the mud deposits found in the deeper parts of the sea, and it seems to be a fact that during their visits to the shallower



## Herschel

waters of the coast, for the purpose of spawning, they do not feed, or at least feed very little. In summer the herring leaves the deep water where it has passed the winter and spring months, and seeks the coast, where it may deposit its eggs to be exposed to the influences of oxygen, heat and sunlight, which are essential to their development. These schools are generally followed by multitudes of hakes and dogfishes, and gulls and other sea birds hover over the shoals. The herring swim near the surface and are therefore easily taken by net. The number of eggs deposited by these fishes is almost incredible, as many as 68,000 having been counted in the roe of one female. Herring, without any apparent cause, often desert parts of the coast where for a time they have been remarkably abundant, not returning in large numbers till after the lapse of a number of years. Such seems to be the case on eastern coasts.

The American species differs somewhat in its external appearance from the common European species. It varies in length from twelve to fifteen inches; the color above is deep blue, tinged with yellow, with silvery sides and lower parts. The mode of fishing for herring is by drift nets. The fishing is carried on only in the night, the most favorable time being when it is quite dark and the surface of the water is ruffled by a breeze. Though not extensively used in the United States, the herring is considered the most important food fish in the world. The so-called herring of the Great Lakes belongs to the salmon family.

**Herschel**, *hur'shel*, JOHN FREDERICK WILLIAM, Sir (1792–1871), an English astronomer, educated at Eton and Cambridge. His first work was in higher mathematics, but later he began astronomical investigations and continued work in astronomy until his death. The important work of his life was the complete telescopic survey of the heavens, which he completed in Cape Town, where he spent four years. He counted 68,948 stars in 2299 different fields of observation. Among his writings are *A Treatise on Sound*, *A Treatise on the Theory of Light*, *Preliminary Discourse on the Study of Natural Philosophy* and *Outlines of Astronomy*.

**Herschel**, WILLIAM, Sir (1738–1822), an English astronomer, born in Hanover, Germany. He began his career as a teacher of music, but had his attention attracted to astronomy, to which he applied himself enthusiastically. While observing what he supposed to be a comet, he discovered a new planet, and this discovery won

## Hesse

him the position of private astronomer to George III. Among his important additions to the science of astronomy was the discovery of Uranus and six satellites and two satellites of Saturn. His sister, Caroline Lucretia (1750–1848), was his constant assistant, and she, too, made various discoveries, among them several nebulae and clusters of stars.

**Hervey**, *hur'vy*, **Islands**. See COOK ISLANDS.

**He'siod**, one of the oldest poets of Greece, probably belonging to the eighth century B. C. Little is known of his life, although it is known that he was one of the class of wandering singers. Of numerous works attributed to him there remain only the *Theogony*, a collection of the oldest fables concerning the birth and achievements of the gods; the *Shield of Hercules*, a fragment of a larger work, and a didactic poem, *Works and Days*, which treats of agriculture and the choice of days for the performance of certain tasks, with prudential precepts concerning education, domestic economy and similar subjects.

**Hesperides**, *hes per'e deez*, in Greek mythology, certain nymphs whose duty it was to guard the golden apples belonging to Hera. In their charge they were assisted by a dragon. The garden where these apples grew was of rather uncertain locality, but Hesiod places it in an island of the ocean far to the west. It was the eleventh labor of Hercules to kill the dragon and bring the golden apples of the Hesperides to Eurystheus. See HERCULES.

**Hesperor'nis**, a fossil bird found in the chalk formation of Kansas. It is about six feet long, without wings; its jaws are armed with teeth, which are not set in sockets, but in a common groove. It has been described as "a kind of swimming, loon-like raptorial ostrich, without fore limbs, with the gape armed with formidable rows of strong teeth, like a gigantic lizard, and with a large, broad and flattened tail like a beaver."

**Hes'perus**. See EVENING STAR.

**Hesse**, *hes*, GRAND DUCHY OF, formerly known as Hesse-Darmstadt, a state of Germany, consisting of two distinct, and a number of minor, divisions. Of the two main portions, one, forming the provinces of Rheinhessen, on the left, and Starkenburg, on the right, bank of the Rhine, lies immediately to the north of Baden; the other, Oberhessen (Upper Hesse), is entirely enclosed by the Prussian province of Hesse-Nassau. Darmstadt is the capital of the grand duchy and of the province of Starkenburg.

## Hesse-Cassel

Upper Hesse is mountainous and contains the arable tract known as the Wetterau. Southern Hesse is partly mountainous, and the greater part of the land lies in the basin of the Rhine, the rest in that of the Weser. The soil is very fertile and produces rye, barley, oats, potatoes and fruit, and the minerals are coal, iron and salt. The vine forms a most important object of culture, and fruit is very abundant. Darmstadt, the capital, Mainz, Giessen, Bingen and Worms are the principal towns. The grand duchy of Hesse originated in the division of the landgraviate of Hesse in 1567, and soon afterward all the territories were included in the two landgraviates of Hesse-Darmstadt and Hesse-Cassel. In 1806 the landgraviate of Hesse-Darmstadt was erected into a grand duchy with an enlarged territory, by Napoleon. It was reduced to its present limits in 1866, in the war between Austria and Prussia, when it had to cede to Prussia some districts in the north, besides Hesse-Homburg, which had been recently reunited with it. The executive authority is now vested in a grand duke, aided by a ministry. Population in 1910, 1,282,051.

**Hesse-Cas'sel**, a former electorate of Germany, now forming the district of Cassel in the Prussian province of Hesse-Nassau. As a landgraviate, Hesse-Cassel dates from 1567, when it was formed by William IV. In 1803 it was made an electorate and in 1806, although William I, the elector, remained neutral in the struggle with France, the territory was seized by Napoleon and made part of the kingdom of Westphalia. In 1813 it was reconstituted an electorate. Because Hesse-Cassel took sides with Austria in the Seven Weeks' War, it was occupied by a Prussian army and later incorporated with Prussia.

**Hessian**, *hesh'an*, **Fly**, a two-winged fly whose larvae are very destructive to wheat, barley and rye crops. It is called the Hessian fly from an unfounded belief that it was introduced into America in the baggage of the Hessians who were employed to fight against the Americans during the War of Independence. The female is about one-eighth of an inch in length, and has a wing expanse of about a quarter of an inch. The body is brown, with the upper parts of the head and thorax of a darker shade, approaching black. The wings are of a dusky gray, surrounded by fringes. The male is somewhat smaller than the female and has longer antennae. The eggs, which are laid in May and in September of each year, hatch in from four to fourteen days. The maggots work themselves in between

## Hewitt

the leaf-sheath and the stem of the grain and, fixing themselves near the lowest joints, suck the



HESSIAN FLY

*a*, Fly, magnified; *b*, natural size; *c*, pupa cases ("flaxseeds") in different stages, natural size and magnified; *d*, barley stem, showing "flaxseeds" in position; *e*, stem bent down as a result of the work of the Hessian fly.

juices of the stem. The Hessian flies are most injurious in wet weather.

**Hessians**, the mercenary auxiliaries hired by Great Britain of the landgrave of Hesse-Cassel to serve against the American patriots. It is also applied to all the German mercenaries used by Britain in the war, of which Hesse-Cassel furnished 17,000, or a little more than half. About 2200 of them were killed in the war, and upwards of 5000 surrendered at Saratoga, Trenton and Bennington. Many deserted and became loyal and industrious American citizens.

**Hew'itt**, **ABRAM STEVENS** (1822-1903), an American politician, born at Haverstraw, N. Y. When a small child, he removed with his parents to New York City and was sent to the public schools, then to Columbia College, from which he was graduated with high honors in 1842. In 1843 he began the study of law and was soon admitted to the bar, but gave up the profession and went into the iron business in partnership with Peter Cooper. The maintenance of Cooper Institute is largely due to Mr. Hewitt's efforts. In 1847 he was nominated by Tammany Hall to Congress. He was elected and was in Congress from that time until 1886, except during one term. In 1886 he was elected mayor of New York City over Henry George and Theodore Roosevelt. After his retirement from the mayoralty, Mr. Hewitt lived quietly, looking after his business interests, but continued to pay attention to municipal problems and reforms. He was elected chairman of the board of trustees of the Carnegie Institution in 1901.



## Hewlett

**Hew'lett**, MAURICE HENRY (1861- ), an English novelist, born in London. He received his education in London and was called to the bar in 1891, but he had early attracted some attention as a writer of romance and continued to devote himself to literary work. His reputation was greatly increased by the production of *Forest Lovers* in 1898. Of his other works the most successful have been *Pan and the Young Shepherd*, *Little Novels of Italy*, *Richard Yealand-Nay*, *New Canterbury Tales* and *A Fool Errant*. Most of these deal with medieval subjects with a remarkably interesting style and fine sentiment. *Open Country*, *The Half-way House*, and *Rest Harrow*, are later novels dealing with modern life and strongly tinged by socialistic doctrines. Among his latest books are *Brazenhead the Great*, a fantastic tale of a medieval braggart; *Lore of Proserpine*, a charming fairy story; *Bendish*, a novel based on the life of Byron; and *Artemision*, a volume of poems.

**Heyse**, *hi'ze*, PAUL (1830-1914), a German novelist, poet and dramatist. Although his dramas were what first won him notice, his fame rests chiefly on his short stories, many of which are already classics. Best known of them is, perhaps, *L'Arrabbiata*. He produced several deftly constructed but pessimistic novels, among them *The Children of the World* and *In Paradise*. *Merlin*, a later novel, is a protest against the modern realistic movement. As a dramatist Heyse was less successful, his plays usually lacking true dramatic qualities. He was awarded the Nobel Prize for literature in 1910.

**Hezeki'ah**, the twelfth and one of the best of the kings of Judah, was the son of Ahaz, whom he succeeded. His reign covered the last quarter of the seventh century B. C.

**Hiawatha**, *hi a wah'tha*, the name of a mythical personage of miraculous birth, believed by the North American Indians to have been sent among them to clear the rivers, forests and hunting grounds and to teach them the arts of peace. The myth has been made the subject of a famous poem by Longfellow.

**Hib'bing**, MINN., a town of Saint Louis co., on the Great Northern and the Duluth, Missabe & Northern railroads, 80 mi. n. w. of Duluth. It is in an important iron and timber district and has mining and lumbering interests. Population in 1910, 8832.

**Hi'berna'tion**, the state of stupor in which many animals spend the cold months of winter or periods of drought and scarcity of food. As the time approaches for this change, the animal

## Hiccough

takes on fat and becomes gradually more and more slow and inactive in its habits, until finally it passes into a deep sleep or stupor, from which it cannot, in some cases, be aroused until the period of cold or scarcity has passed. The depth and character of this stupor differ decidedly in different animals and in the same animals in different regions; they seem to be governed by the habits of the creatures during many generations. When an animal comes out of this state it has lost very much in flesh, and it is comparatively weak and inert, but after a short time it regains its natural vigor. Not all animals hibernate; in fact, the hibernating animals are chiefly those that feed upon vegetable matter. Indeed, some of these store food upon which they live during the cold season or, like the squirrels, hibernate for brief periods, which alternate with other periods of hunting for food. The woodchuck is one of the most notable hibernators, and almost all of the burrowing animals are similar in habit. In some species of birds it is only the females that hibernate, though the males sleep for long periods of time. Some mammals hibernate in the Northern states, but not in the South. Frogs, snakes and some fishes hibernate, the land animals burying themselves in the ground below the frost line, and the fish going into the mud beneath the water.

**Hibernia**, *hi bur'ne ah*, the ancient name of Ireland, applied to it first by Julius Caesar. Aristotle mentions this island by the name of *Ierne*; Ptolemy calls it *Juvena* and describes the island, with its principal rivers, towns and harbors.

**Hibis'cus**, an extensive genus of plants of the mallow family, chiefly natives of tropical climates. They have large, showy flowers, borne singly upon stalks toward the ends of the branches. They are chiefly shrubs, but one or two are herbs and a few attain the dimensions of trees. They are remarkable for abounding in mucilage and for the tenacity of the fiber of their bark, which in several species has many economic uses. The petals of the variety having large, handsome, usually red flowers, frequently seen in greenhouses, are used in China for a black dye for the hair and eyebrows. The root yields a mucilage used in Japan to give a proper consistency to paper. The leaves are eatable, and an oil is extracted from the seeds. In India the hibiscus is cultivated for its fiber and is known as Indian hemp.

**Hiccough**, *hik'kup*, or **Hic'cup**, a sudden convulsive spasm of the diaphragm, which stops the

## Hickory

inspiration of air and produces a peculiar sound in the larynx. These convulsions come at brief intervals and may continue for a few moments, for hours, or, rarely, even till they cause exhaustion and death. Acute attacks of hiccoughs may be caused by an overloaded stomach or by some derangement of the digestive processes. These acute attacks may often be stopped by a long, slow inspiration or by a drink of water taken slowly, and oftentimes the attack will stop if the person's attention is distracted from it. Hiccough is also an accompaniment of a number of diseases, such as peritonitis, appendicitis and pneumonia, in which it is regarded as a grave symptom.

**Hick'ory**, the name given to several species of timber trees, natives of North America and remarkable for stateliness and general beauty. The wood is heavy, strong and tenacious and is used for making such things as carriage shafts, screws, whip handles and cogged wheels. The shagbark species yields the hickory nut of commerce, and its wood is very valuable.

**Hicks**, THOMAS HOLIDAY (1798-1865), an American politician born in Dorchester County, Maryland. He early entered politics and held at different times many important offices in his state, becoming governor in 1858. At the opening of the Civil War he sympathized with the South, but attempted to maintain neutrality for Maryland, in order to save the state from devastation by Union armies. Conditions finally compelled Hicks to assume a more stern attitude against the secessionists, and early in the struggle he was working vigorously for the Lincoln administration.

**Hicks-Beach**, MICHAEL EDWARD, Sir (1837- ), Viscount St. Aldwyn, an English politician. He entered Parliament in 1864 and served continuously until 1906. He served successively as undersecretary of the home department, chief secretary for Ireland, secretary for chief secretary for Ireland, secretary for the colonies, president of the board of trade and chancellor of the exchequer.

**Hides**. See LEATHER.

**Hierarchy**, *hi'ur ahrk y*, (Greek *hieros*, sacred, and *arche*, government), a term sometimes applied to the Church, sometimes to the authority which the governing body of the Church exercises as civil magistrate. In the Middle Ages the papal hierarchy, in the latter sense, gathered great temporal strength, and the pope became a spiritual monarch, ruling western Christendom with power but feebly limited by princes and

## Hieroglyphics

councils. A reactionary movement began in the fourteenth century, and the general tendency of subsequent events has always been to make the civil and hierarchical power more and more independent of each other. The term *hierarchy*, as used to denote the governing and ministering body in the church, consisting of several ranks, can strictly be applied only to those churches which are ruled by bishops, such as the Roman Catholic Church and the Anglican Church.

**Hieroglyphics**, *hi'ur o glif'iks*, (from the Greek, meaning *sacred carving*), a term originally applied by the Greeks to the inscriptions sculptured on buildings in Egypt, in the belief that the writing was confined to sacred subjects and legible only to the priests. The term as commonly used means any system of writing by means of pictures, but is particularly applied to the writings of the Egyptians and the Mexicans.

Three different modes of writing were used by the ancient Egyptians, the hieroglyphic, the hieratic and the demotic. Pure *hieroglyphic* writing is the earliest, and consists of figures of material objects from every sphere of nature and art, with certain mathematical and arbitrary symbols.



CARTOUCHE OF  
PTOLEMY

Next was developed the *hieratic*, or priestly, writing, the form in which most Egyptian literature is written, and in which the symbols almost cease to be recognizable as figures of objects. Hieratic writings of the third millennium B. C. are extant. In the *demotic* writing, derived directly from the hieratic, the symbols are still more obscured. The demotic was first used about the seventh century B. C., and within two or three centuries it had become so common that it was used for practically everything except religious purposes.

Down to the end of the eighteenth century scholars failed to find a clue to the hieroglyphic writings. In 1799, however, a French captain of engineers discovered at Rosetta the celebrated stone which afforded European scholars a key to the language and writing of the ancient Egyptians. It contained a trilingual inscription, in hieroglyphics, demotic characters and Greek, which turned out to be a decree of the priests in honor of Ptolemy V, issued in 195 B. C. The last paragraph of the Greek inscription stated that two translations, one in the sacred and the



CARTOUCHE  
OF CLEO-  
PATRA



## Hieroglyphics

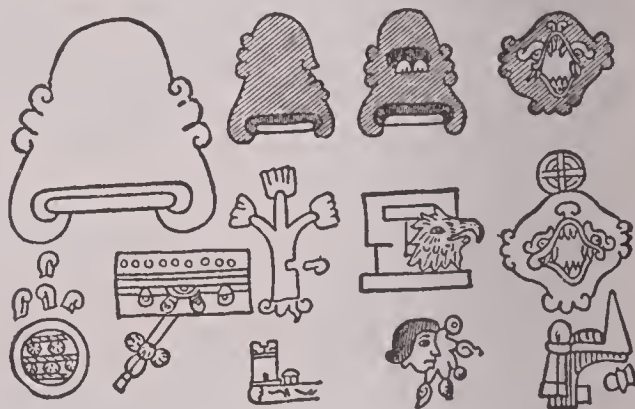
other in the popular Egyptian language, would be found adjacent to it. The discovery of an alphabet was the first task. The demotic part of the inscription was first examined by De Sacy and Akerbald, and the signification of a number of the symbols was ascertained. The hieroglyphic part was next carefully examined and compared with the demotic and Greek. At last, after much study, Champollion and Dr. Thomas Young, independently of each other, discovered the method of reading the characters and thus provided a clue to the decipherment of the ancient Egyptian writing.

Hieroglyphic characters are either *ideographic*, that is, using well-known objects as symbols of conceptions, or *phonetic*, that is, representing words by symbols standing for their sounds. The phonetic signs are again divided into alphabetical signs and syllabic signs. Many of the ideographic characters are simple enough; thus, the figures of a man, a woman, a calf, indicate simply those objects. Others, however, are less simple and convey their meaning figuratively or symbolically. Water was expressed by three zigzag lines, one above the other, to represent waves or ripples of running water; milk by a milk jar; oil by an oil jar; fishing by a pelican seizing a fish; seeing and sight by an eye, and so on. The nature of the phonetic hieroglyphs, which represent simply sounds, will be understood from the following explanation, which gives also some idea of the first steps in the decipherment.

(1) The first hieroglyph in the name of Kleopatra is a knee, which is *knc* or *kne* in Coptic and represents the K of Kleopatra. (2) The second hieroglyph in Kleopatra is a lion couchant, which is *laboi* in Coptic and *labu* in the old Egyptian and represents the L of both Kleopatra and Ptolemaios (Ptolemy). In Kleopatra it occupies the second place, and in Ptolemaios the fourth. (3) The third hieroglyph in Kleopatra is a reed, which is *ake* in Coptic and *aak* in the old Egyptian and represents the E of Kleopatra. The reed is doubled in Ptolemaios and occupies the sixth and seventh places, where it represents the diphthong *ai* of Ptolemaios. (4) The fourth hieroglyph in Kleopatra is a noose, which represents the O of both names and occurs in the third place of Ptolemaios. (5) The fifth hieroglyph in Kleopatra is a mat, which represents the P of both names and is the initial letter of Ptolemaios. (6) The sixth hieroglyph in Kleopatra is an eagle, which is *akhoom* in Coptic and represents the A, which is found twice in the name Kleopatra,

## Hieroglyphics

but does not occur in the name Ptolemaios, although the diphthong *ai* occurs as described above. (7) The seventh hieroglyph in Kleopatra is a hand, which is *toot* in Coptic and represents the T of Kleopatra, but does not occur in Ptolemaios, where it might be expected to occupy the second place. The second place in Ptolemaios is occupied by a semicircle, which is found at the end of feminine proper names and is the Coptic feminine article T. The researches of Champollion satisfied him of the existence of characters having the same phonetic value, which might be interchanged in writing proper names. (8) The eighth hieroglyph in Kleopatra is a mouth, which is *ro* in Coptic and represents the R of Kleopatra. (9) The ninth hieroglyph in Kleopatra is the cage, which is explained in



MEXICAN HIEROGLYPHICS

No. 6, above. (10) The semicircle is the T of Ptolemaios, which with 11, the egg found at the end of proper names of women, is a feminine affix. In the name of Ptolemaios there are still the M and the S to account for. The fifth hieroglyph in the name of Ptolemaios is a geometrical figure, probably originally representing the three sides of a parallelogram, but now called a hole, because the Coptic *mu* has that signification. It represents the M. The hook represents the S of the word Ptolemaios. Vowels were regarded by the Egyptians only as they were needed to avoid ambiguous writing. The oval frame which surrounds the names and which is known as a *cartouche* was always used to enclose the names of kings.

The hieroglyphics of the Aztecs or Mexicans, used in Central America and Mexico previous to the discovery of America by Columbus, were much less perfect than the Egyptian. The characters were for the most part ideographic, and the pictures used were highly conventionalized, though the system was for the most part rude. Most of the manuscripts containing these

## Higginson

hieroglyphics have been destroyed, so that the Mexican writing is almost entirely unintelligible.

There have been found groups of hieroglyphics which combine the two kinds of characters—the ideographic and the phonetic. According to Ebers, in the perfected system of hieroglyphics the symbols for sound and syllables are to be regarded as the foundation of the writing, while symbols for ideas are mingled with them to render the meaning more intelligible, to furnish ornamentation or to keep up the mystic character of the hieroglyphics.

**Hig'ginson**, THOMAS WENTWORTH (1823-1911), an American essayist, born at Cambridge, Mass. He graduated at Harvard in 1841 and began preaching, but subsequently left the ministry to devote himself to literature and became conspicuous as an antislavery agitator. In 1862 he served as captain of the fifty-first Massachusetts regiment, and in that same year he was made colonel of the first regiment of freed slaves mustered into the national service. Among his works are *Outdoor Papers*, *Army Life in a Black Regiment*, *Oldport Days*, *Common Sense about Woman*, *Cheerful Yesterdays*, *History of the United States* and a memoir of Longfellow. Higginson was an earnest advocate of woman's suffrage.

**Highbinders**, a name applied in California to the lower class of Chinamen, who have no regular occupation, but secure their living through gambling, thievery and connivance with criminals.

**High Point**, N. C., a city of Guilford co., situated on the Southern Railroad, 34 mi. n. e. of Salisbury. The surrounding country is devoted to agricultural and mining industries, among which poultry raising and truck farming are important. The leading industries of the city are the manufacture of furniture, electric cars, hosiery, cloth, tobacco and cotton. Population in 1910, 9525.

**High Priest**, the chief of the Jewish priesthood. The office was first vested in Aaron and was handed down to his eldest son, Eleazer, and so on in regular succession. At first the office was for life, but Herod, and afterward the Romans, jealous of the power which so long a term gave the high priest, made and unmade the pontiffs at will. A high priest might not assume the office till he was twenty. His duties were to oversee the sanctuary, its service and its treasure, and on the Day of Atonement to enter the Holy of Holies. He could perform any priestly function. His vestments were very costly, but when

## High Seas

he went to the Holy of Holies he wore only a white garb.

**High School**, a public school, ranking in its grade of instruction between the grammar school (See COMMON SCHOOLS) and the college. The first public high school in the United States was the English High School of Boston, which was established in 1821. Since that time the high school has become a general and potent factor in all systems of public education throughout the country. The courses of study usually include those subjects required for admission to universities and technical schools and such other branches as will fit for life those who do not desire to attend higher institutions of learning. Most high schools now maintain commercial courses, and many have departments of manual training and domestic science. The support of the high school in the United States depends upon the system of education in the state where it is located. Most high schools are a part of the city system of schools and are supported in the same manner as other schools. In some states direct state aid is given to high schools which reach a required standing, and such schools are affiliated directly with the state university. In Minnesota the university prescribes the questions for final examinations in the affiliated high schools, those graduates who reach a certain standard being admitted to the university without further examination. In Wisconsin the university, by means of frequent reports and inspections, keeps in close touch with the high schools of the state and prepares a so-called accredited list of schools, the graduates of which may enter the university without further examination. The graduates of other schools must undergo a test at the university. Some states, of which Illinois is a typical example, have provided for establishing township high schools. One or more townships may constitute the territory from which the school derives its support and in which pupils may be educated free of the charge of tuition. This provision often admits of the establishment of a high school in localities where there are no cities or towns of sufficient size to support a school of high school grade.

**High Seas**, the open sea or ocean. The claims of various nations to exclusive rights and superiority over extensive tracts of the ocean-highway have been settled after much controversy by a general international principle, namely, that the jurisdiction of maritime states extends only for three miles from their own coasts; the remainder of the seas are accessible on equal



## Highways

terms to all nations. Inland seas and estuaries, of course, are excepted.

**High'ways**, places over which the public has a right to go. They include roads, streets, paths, driveways, canals, ferries, bridges, navigable streams and public squares. Highways may be created by act of government, or *condemnation*, in which case the owner of the property which is transformed into a highway is recompensed according to the value of his property, or they may be created by *dedication*, that is, through the voluntary act of the owner of the property. In order for it to be a highway, however, its dedication must be accepted by the authorities who are compelled by law to keep it in repair. This dedication may be either express or implied. If an owner without protest allows the public to pass over a part of his property for a considerable period of time, the law will consider that he has by implication created a highway and will not permit him to close it.

In most countries, the authority over highways rests with the smallest political divisions, such as the parish in England and the town or county in the United States. However, in the United States the authority originally rested with the state, which has delegated its right to the smaller divisions. Though the public has a right to the use of the highway, it does not own the land over which it passes, but this ownership rests with the owners of the abutting property. This naturally implies a right in the public or in any traveler to the use of the whole highway, and therefore a right to remove an obstruction in any part of it, while it also implies the right of the owners of the abutting property to all the value of the land beneath the street, that is, to mines or any other thing of value which is found there. Any legislature may establish private highways, giving the persons to whom it grants the road a right to exact toll or taxes from passers-by to pay for its repair.

In the United States teams meeting in a highway are supposed to turn to the right, while in England they are expected to turn to the left. This rule has been recognized by law in most states, and in case of accident from its violation, the violator will be liable for damages. See ROAD.

**Hil'dreth**, RICHARD (1807-1865), an American historian, born in Massachusetts. He graduated at Harvard, studied law and was admitted to the bar. After practicing for two years he became editor of the Boston *Atlas*, a leading political paper. For two years he lived on a

## Hill

plantation in Florida, and as a result of his observations he published a novel, *The Slave*, or a *Memoir of Archy Moore*, attacking slavery. This was afterwards republished as *The White Slave*. The work for which he is best known is his *History of the United States*, an accurate account of the history of the country up to Monroe's administration. The bias is strongly Federalist.

**Hill**, an elevation of land, rising above the surrounding country but lower than a mountain. Very high hills are often called mountains, although this term should not be applied to them when their altitude is less than two thousand feet. Hills are frequently formed by erosion (See EROSION); for instance, the wearing away of plateaus by streams frequently cuts them into hills, whose crests are on a level with the surface of the plateau (See MESA). Hills are sometimes formed by volcanic action. These take the form of cones and are found in the craters of volcanoes, or they may have been formed by the cooling of molten lava, in which case they are known as *coulees* (See VOLCANO). They may be formed by glaciers, which on melting deposit their load of stones and gravel (See MORaine). The ranges of hills about the base of mountains are called foothills. See MOUNTAIN.

**Hill**, AMBROSE POWELL (1825-1865), an American soldier. He graduated at the United States Military Academy in 1847, entered the first artillery and was made second lieutenant. He served in the Mexican War and afterward on the frontier and in Florida. Later he was promoted to be captain. At the outbreak of the Civil War he entered the Confederate service, was appointed colonel of the thirteenth regiment of Virginia volunteers and was ordered to Harper's Ferry. He fought at the first Battle of Bull Run, at Antietam, Fredericksburg, Chancellorsville and Gettysburg, was promoted to be brigadier general and later was made major general. He was killed while reconnoitering at Petersburg.

**Hill**, BENJAMIN HARVEY (1823-1882), an American legislator, born in Georgia and educated at the state university. He was admitted to the bar, entered politics and in 1851 was chosen to the state legislature as a Whig. In the controversy over secession he was a Unionist, but followed his state and was chosen to the first Confederate Senate. After the war he was a prominent Democrat, vigorously opposed Congressional reconstruction, supported Greeley for the presidency and became a member of the House of

## Hill

Representatives in 1875. In the following year he was chosen to the United States Senate, where he served until his death.

**Hill, DANIEL HARVEY** (1821–1889), an American soldier. He graduated at the West Point Military Academy in 1842, served throughout the Mexican War and attained the brevet of major. At the beginning of the Civil War he entered the Confederate army and was made colonel of the First North Carolina regiment. On June 10, 1861, he fought the Battle of Big Bethel, was soon promoted to be brigadier general and fought against McClellan in the Peninsula Campaign. He took part in the battles of Antietam and Chickamauga.

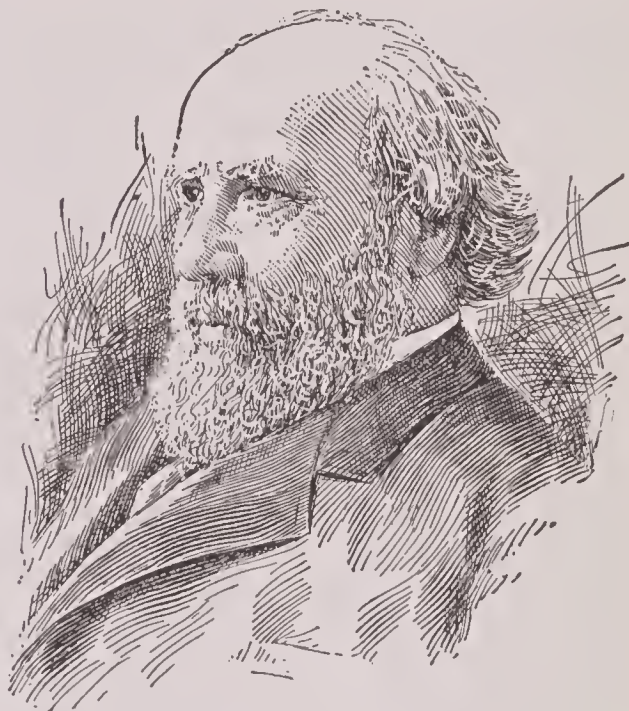
**Hill, DAVID BENNETT** (1843–1910), an American politician, born in Havana, N. Y. He was admitted to the bar in 1864, practiced law at Elmira and in 1870–1871 served in the state legislature. In 1882 he was elected mayor of Elmira; in November of the same year, he was chosen lieutenant governor of New York State, and in 1884, when Grover Cleveland resigned the position of governor, he succeeded to that office. In 1885 he was elected governor for the term expiring in 1888 and was reelected. He then became United States senator for New York State, but failed of reelection because the legislature elected in 1896 was Republican. He was a prominent candidate for the Democratic nomination for president in 1892.

**Hill, DAVID JAYNE** (1850– ), an American author and educator, born at Plainfield, N. J., and educated at Bucknell University. He was professor of rhetoric in his alma mater for two years and then became president of the institution. In 1888 he was called to the presidency of the University of Rochester, where he remained eight years. For five years he was assistant secretary of state at Washington. He was then in turn minister to Switzerland, to the Netherlands, and ambassador to Germany. He is the author of *A History of Diplomacy in the International Development of Europe*, a life of Grotius and other works.

**Hill, JAMES J.** (1838–1916), an American capitalist and promoter, born near Guelph, Ontario, of Scotch-Irish descent. He early emigrated to Minnesota, where he was employed in steamship offices until 1865. Later he engaged in independent fuel and transportation business, becoming interested in extending communication between the Mississippi River and the North and West. Gaining control of the Saint Paul & Pacific railroad company, he reorgan-

## Hill

ized the system, became successively its general manager, vice-president and president and made it the nucleus of the Great Northern system, which he organized in 1890, having meantime completed rail communication between Lake



JAMES J. HILL

Superior and Puget Sound and established a steamship line between America and the Orient. In 1902 he was the chief promoter of the Northern Securities Company, which aimed to establish a community of interest between several trans-continental lines.

**Hill, ROBERT THOMAS** (1858– ), an American geologist, born in Nashville, Tenn. After living for some time in Texas, where he studied geography and geology, he entered Cornell University and began the study of science. Before his graduation he was appointed to the United States Geological Survey, and a little later he became professor of geology in the University of Texas, which position he gave up to return to the Geological Survey, where he afterwards remained. Hill's important explorations have been along the southern border and in the southwestern portions of the United States. He is also known by his demonstration of the existence of the Lower Cretaceous formations in the United States and the existence of such conditions as made artesian wells possible over a large dry area in Texas, the results of which have been the sinking of numerous wells and the irrigation of a large region which was before valueless. His important work is *Cuba and Porto Rico with Other Islands of the West Indies*.



## Hillis

**Hil'lis**, NEWELL DWIGHT (1858- ), a Presbyterian clergyman, born at Magnolia, Iowa, and educated at Iowa College, Lake Forest University and McCormick Theological Seminary. He served as pastor at Peoria, Ill., and Evanston, Ill., and succeeded David Swing as pastor of Central Church, Chicago. In 1899 he accepted a call to Plymouth Church, Brooklyn. He is the author of *The Investment of Influence, How the Inner Light Failed, Great Books as Life Teachers* and other works.

**Hillsboro**, *hiltz'bur o*, TEX., the county-seat of Hill co., 34 mi. n. of Waco, on the Missouri, Kansas & Texas and other railroads. The city is in a fertile agricultural region and has a large trade in cotton, grain, live stock, hides and lumber. It has one of the largest cotton compresses in the state; also cotton gins and oil mills, flour and planing mills and manufactories of hosiery, clothing, agricultural implements and other articles. Population in 1910, 6115.

**Hilo**, *he'lo*, the chief town of the island of Hawaii, and the second largest in the Sandwich Islands. The soil in the neighborhood is very fertile and produces sugar, rice, arrowroot and coffee. There are also extensive forests. Population in 1910, 6745.

**Himalaya**, *him mah'la yah*, a chain of snowy mountains in Asia, the most elevated on the earth; they separate the Indian peninsula from the plateau of Tibet. The length is nearly 1500 miles, the great mass reaching from the great bend of the Indus on the west to the great bend of the Brahmaputra on the east, and the breadth is from 100 to 160 miles. The Himalayas are not a single mountain system, but form a series of rugged peaks. The average elevation of the range has been estimated at from 16,000 to 18,000 feet, but many of the peaks are known to exceed 24,000 feet. Among the highest points are Mount Everest, 29,002 feet, so far as known the highest point in the world; Nanga Parbat, 26,629 feet; Dhawalaghira, 26,826, and Kunchinjunga, 28,156. Among the numerous passes, which are the loftiest in the world, are the Ibi Gamin, 20,459 feet; the Mustagh Pass, 19,000 feet; the Mana Ghat; the Parang La, and the Chang La. The Himalayas abound in giant glaciers, the longest being the Zamu, which measures eighteen miles. There are no lakes in the region, and there are no volcanoes, but earthquakes are frequent. The chain is divided into a west, middle and east portion. The west is that drained by the five rivers of the Punjab, from the Indus to Sutlej; the middle portion,

## Hindu-Kush

that drained by the Ganges, and the east, that drained by the Brahmaputra.

The vegetation is extremely varied, and on the steep southern slopes it is very luxuriant. Tropical plants, such as the plantain, fig and palm trees, are found up to a height of 3000 feet, and beyond this, up to 7000 feet, is a belt in which oaks, chestnuts and laurels are common. The succeeding belt, up to about 12,000 feet, has deodar, cedars and pines, and beyond this are the regions of gnarled trees and shrubs and the grass lands. The highest point at which trees are found is 14,000 feet, on the north side, but in the central range trees are not common above 11,000 or 12,000 feet. Grain is grown on the north side at 14,000 to 15,000 feet. The mountains are famous for their wonderful growths of rhododendron, and the flowering plants are found at an altitude of 19,500 feet. The tea plant is grown up to 5000 feet on the southern face. The animal life is also abundant and varied and conforms in distribution to that of the plant life. The tiger, leopard, rhinoceros and monkey are found. The region around Tibet is the home of the yak, and the mountains may also be considered as the home of the pheasants. The more important explorations of the Himalayas are those of Hooker, the Schlagintweit brothers, Waugh, Graham and Sir William Conway.

**Hindenburg**, PAUL VON BENECKENDORF UND VON (1847- ), a German military commander born in Posen. He served in the war against Austria in 1866, and in the Franco-Prussian War won distinction at Königgratz and in the Battle of Sedan. After the war he received a military education and became a member of the General Staff and was head of the war department. He retired in 1911, but on the breaking out of the War of the Nations in 1914 was recalled and given command of the campaign against Russia in which he won notable victories. Again, in 1915, he commanded the drive into Russia, conquered Poland. He was made field marshal and was twice decorated with the iron cross. See WAR OF THE NATIONS.

**Hindu-Kush**, *hin'doo koosh*, or **Indian Caucasus**, a mountain system of Central Asia. It is generally considered as a continuation of the Himalayas. Its culminating point, Tirach Mir, in the range of Hindu-Koh, is far beyond the limit of perpetual snow and is supposed to measure 25,000 feet high. The Oxus and several other streams have their source in these mountains.



PAUL VON BENKENDORF HINDENBURG  
A Field Marshal of Germany





## Hindustan

**Hindustan**, *hin doo stahn'*, the name which is commonly given to the whole Indian Empire, but which properly applies only to the Punjab and the Ganges valley. See INDIA.

**Hin'nom**, VALLEY OF. See GEHENNA.

**Hins'dale**, BURKE AARON (1837-1900), a prominent American educator, born at Wadsworth, Ohio. He was educated in the public schools and first came into prominence as president of Hiram College. After twelve years of service there he became superintendent of the Cleveland, Ohio, public schools. In 1888 he accepted the chair of science and art of teaching in the University of Michigan, which position he held until his death. He rendered most important services in raising his department in this institution to a rank among the best in the country. He was a distinguished member of the National Educational Association and of the National Council of Education. He published several works of recognized authority, among which are *Teaching the Language Arts*, *Jesus as a Teacher*, *Studies in Education*, *How to Study and Teach History* and *The American Government*.

**Hippa'rion**, a fossil genus of the horse family, of the Upper Miocene and Pliocene periods. The members are distinguished by the fact that each foot possesses a single fully-developed toe, bordered by two functionless toes, which do not touch the ground, but simply dangle on each side of the central toe. The hipparion was about the size of an ass; one American species was, however, about the size of a goat.

**Hip'pocam'pus** or **Sea Horse**, a genus of fishes, closely allied to the pipefishes, of singular construction and peculiar habits; the upper parts have some resemblance to the head and neck of a horse in miniature, which has suggested the name. When swimming they maintain a vertical position. The tail curls downward and inward and can be used to hold on to seaweed. Their general length is from six to ten inches. These fishes are found in the Mediterranean and the Atlantic. A curious fact is that the male carries the eggs in little pockets until they are hatched.



SEA HORSE

**Hippocrates**, *hip pok'ra teez*, (460-357 B. C.), the most famous among the Greek physicians, often called the "father of medicine." Besides

## Hippopotamus

practicing and teaching his profession at home in the island of Cos, he traveled on the mainland of Greece and died at an advanced age at Larissa, in Thessaly. His writings, which were early celebrated, became the nucleus of a collection of medical treatises by a number of authors of different places and periods, which were long attributed to him and still bear his name.

**Hip'podrome**, the Greek name for the public place where the horse and chariot races were held. In Byzantine times the hippodrome at Constantinople acquired great renown, and factions originating in the hippodrome caused perpetual confusion in all departments of the public service. The name is sometimes applied to a modern circus, and specifically to great amusement places in London and New York.

**Hip'popot'amus**, an unwieldy African animal, of which two living species are known. One



HIPPOPOTAMUS

species is of large size and is common throughout the greater part of the continent; the other is not only smaller, but has other important differences and is found only in the west coast rivers and those flowing into Lake Chad. The large species has a thick, square head, a very large muzzle, small eyes and ears, a thick and heavy body, short legs, a short tail and no hair, except at the extremity of the tail. It has also tusks, which sometimes reach the length of two feet and more and which weigh upward of six pounds. The animal is killed by the natives, partly for food, but chiefly on account of the tusks and teeth, which are harder than ivory and less liable to turn yellow. The hippopotamus is remarkable for its "blood sweat," a



## Hiroshima

blood-red fluid exuded from and covering the skin, but it has no connection with the blood. The hippopotamus occasionally reaches the length of seventeen feet and stands about five feet high. It delights in water, living in lakes, rivers and estuaries and feeding on water plants or on the herbage growing near the water. It is an excellent swimmer and diver and can remain under water a considerable time. Among the ancient Egyptians it was revered as a divinity, as it is still among the negroes in some localities.

**Hiroshima**, *he'ro she'mah*, a city of Japan, situated near the southwestern extremity of the island of Hondo, on the coast and on the railway connecting Osaka with Shimonoseki. It is one of the important commercial ports of the Empire and has a large trade in lacquer ware and bronzes. Population in 1908, 142,763.

**Hirsch**, *heersh*, EMIL GUSTAV (1852- ), an American rabbi, born in Luxemburg. He came to the United States in 1866 and later graduated from the universities of Pennsylvania, Berlin and Leipzig. At different times he was rabbi at Baltimore, Louisville and Chicago, doing his best work as rabbi of the Sinai Congregation in the last-named city. In 1892 he became professor of Hebrew in the University of Chicago. A volume of his sermons has been published.

**Hirsch**, MAURICE, Baron de (1831-1896), an Austrian financier and philanthropist, born of Jewish parentage in Batavia. He accumulated his fortune in the banking-house of Bischoffsheim and Goldsmid, in the construction of railroads and in other enterprises. By his munificent gifts he promoted the cause of education in various parts of the world. In Egypt and Turkey he founded industrial schools, and in 1888 he offered the Russian government \$10,000,000 for schools, on the condition that race and religious distinctions should not influence the distribution of the fund. It is reported that in one year alone he gave \$15,000,000 to charity. In 1892 his contribution for the benefit of Jewish emigrants from Russia to America amounted to \$2,500,000.

**Histology**, *his tol'o jy*, that branch of anatomy which treats of the microscopic structure of the different tissues of the body. The science originated as far back as the seventh century, but it made little progress until the invention of the compound microscope in the nineteenth century. Since that time, by the combination of the microscope and camera, many important discoveries in the structure of tissues have been

## History

made. It was through histology that the peculiar cell structure of the different tissues was discovered; also by the aid of the microscope the presence of nerves and blood vessels in these tissues was revealed. Many diseases are determined by studying the different tissues and glands under the microscope, because most of these diseases are due to some disorganization of the cells.

**History**. This term has three meanings, which are sufficiently distinguished in modern usage to be considered separately. It denotes the events, forces and institutions which together disclose a people's social character and progress; it denotes the branch of science which studies these things, and, finally, it denotes the branch of literature in which they are narrated and discussed.

In the first sense the history of a people includes every item which has interest or importance in connection with that people's life and growth. Thus, it deals with social, industrial, intellectual, religious and political facts and with the lives of men, to the extent that the lives of individuals affect the course of any people's history. Some writers have asserted, as does Emerson, that the "history of any people may be resolved into the biographies of a few great men." This statement is hardly true, in a broad sense, however, for the central fact of all history has apparently been the struggle of man for liberty or for the truth, and though this struggle has often been led by great individuals it has always been the outgrowth of social conditions and has been carried forward by the many rather than by the few.

As a study, or branch of science, history differs from other sciences in lacking their exact character. The laws of mathematics and of physics are fixed and determinable, but since history deals with all the influences which affect human life, and these are infinite in number and variety, the laws of human progress cannot be framed with such a degree of certainty; so, with sociology, economics and politics, history may be classed as an inexact science. It differs from both sociology and politics in that it seeks only to ascertain and interpret facts, but in itself does not attempt to discover the general principles by which those facts are related. Historical investigators are dependent upon certain classes of materials for their information. These may be called (1) remains, such as buildings, implements and ruins; (2) laws and documents, from which governmental facts may be ascertained; (3) art

and literature, in which the general social character and ideals of a people are disclosed; (4) contemporary historical narratives or annals, and (5) traditions. Besides collecting facts from such evidence, the historian must arrange and classify them, both as to their position in time and place and as to their importance. He must then study them critically, for the purpose of discarding those which are fraudulent or untrue. Having accepted a body of information, he must then interpret it in the light of his knowledge of human nature and of other facts in his possession.

In accordance with these processes, human history has been organized into somewhat arbitrary divisions upon a chronological basis. *Ancient* history deals with the civilizations and careers of the nations of antiquity, such as Babylonia, Assyria, Egypt, Greece and Rome. It begins with the first event whose character is positively known and whose results can be traced. This is about ten thousand years ago. Its termination is variously assigned by historians, some considering it to be at the downfall of the Roman Empire before the German barbarians in the fifth century, others extending it till the time of Charlemagne, when a new order of things was plainly beginning to arise, and still others, with perhaps best reason, making it end only at the death of Charlemagne and the dissolution of his empire in 814. At that point *medieval* history begins, including the centuries of confusion during which the ideals of universal unity, in politics, religion and thought, which prevailed in the ancient world, were supplanted by extreme individualism, which, in turn, gave way in the *modern* world to the ideal of nationality, a compromise between the two. This date may be placed at about the middle of the fifteenth century, at the fall of Constantinople, when the nations of Europe, with whom history chiefly deals, first consciously felt the spirit of modern progress which turned them from the East toward the West and into the paths of modern civilization.

As a branch of literature, history is of the greatest importance, for it includes some of the earliest and greatest writings known to men. But a noticeable change has taken place within the last few centuries in the manner and method of historical writing. For centuries writers were compelled to rely upon myths, traditions and oral testimonies. They had little basis upon which to criticise facts and made little effort to secure absolute accuracy. So the earliest historical writings are interesting, not, chiefly,

for the historical facts which they contain, but for their literary merit. But in recent times, with the development of the scientific spirit and its extension into all fields of study, historians, though still paying attention to literary form, have directed their efforts particularly to the search for truth and its narration without prejudice or partiality. Through this change the importance and value of history study was increased many fold, for it is upon history that the students of all other social sciences must rely for the data upon which to judge of present conditions and tendencies.

The spirit and content of history have been ably discussed by some of the greatest writers of recent times, and the reader is referred to such excellent essays as that of Ralph Waldo Emerson on *History* and Frederic Harrison on the *Meaning of History*. The following list includes many of those historical works which critics have considered most far-reaching in their influence:

Herodotus's *History*; Thucydides's *History of the Peloponnesian Wars*; Xenophon's *Memorabilia*; Polybius's *Histories*; Caesar's *Commentaries*; Livy's *Ab urbe condita libri*; Tacitus's *Histories* and *Annals*; Gibbon's *Decline and Fall of the Roman Empire*; Voltaire's *Age of Louis XIV*; Mommsen's *History of Rome*; Rankc's *History of the Popes* and *Universal History*; Macaulay's *History of England from the Accession of James II*; Freeman's *History of the Norman Conquest*; Green's *History of the English People*; Lecky's *History of the Rise and Influence of the Spirit of Rationalism in Europe*; Buckle's *History of Civilization*; Froude's *History of England from the Fall of Wolsey to the Defeat of the Spanish Armada*; Carlyle's *The French Revolution*; Grote's *Greece*; Guizot's *History of Civilization*; Bancroft's *History of the United States*; Prescott's *History of the Conquest of Peru* and *History of the Conquest of Mexico*; Parkman's series of works upon the French in America, beginning with *Pioneers of France in the New World* and closing with *The Conspiracy of Pontiac*; Motley's *The Rise of the Dutch Republic* and *The History of the United Netherlands*; Fiske's series of works covering the whole field of American history, of which the best is probably *The Critical Period of American History*; Ridpath's *History of All Nations and Races*; MacMaster's *History of the People of the United States*, and Rhodes's *History of the United States from the Compromise of 1850*. See HISTORY, METHODS OF TEACHING.



**History, METHODS OF TEACHING. PURPOSES.** The purposes of teaching history are:

1. To teach the facts of history so that the pupils will be well informed concerning the origin and growth of the country and the principles upon which the nation is established.

2. To stimulate patriotism. Patriotism may be considered as of two classes, military and civic. Of the former class there is no lack. The opportunity to join an army, to engage in military parades and to go forth to war contains attractions that appeal strongly to young men, and whenever the country is imperiled by enemies, foreign or domestic, there are always thousands ready to rush to her defense.

Military patriotism needs little encouragement; it is not the sort that requires the greatest amount of attention on the part of the teacher. Civic patriotism is of a more quiet nature; yet it often requires the exercise of a moral heroism far greater than the physical courage required of the soldier. Civic patriotism includes all of those virtues that make the honest and upright citizen; the man who would not wrong another in business; who is careful and conscientious in the discharge of all of his political duties, and who is willing, if called upon, to accept public office and discharge his duties faithfully, because of his interest in the public welfare. Patriotism of this sort needs to be emphasized; nowhere can this be done to better advantage than in the history class.

3. To develop the minds of the pupils. History is a valuable study for the purpose of appealing to the imagination, exercising the memory and strengthening the reasoning powers. This last line of development, however, should be left largely to the work of the advanced grades; but the history stories suitable for the lower grades, both primary and intermediate, are remarkably well adapted to training the imagination and memory and to materially assisting the pupil in the development of language.

4. To train the judgment. History is far from being a memory study. It presents a series of problems, each of which arises from certain causes and must be solved in accordance with certain conditions. In the discovery of these causes and conditions and the forming of conclusions by their comparison, there is afforded one of the best opportunities possible for training the reasoning powers. Since history is not an exact science (See HISTORY), and since the causes and conditions are largely dependent

upon human action, the problems to which they give rise are more various, more complex and more far-reaching than are the problems of mathematics and other exact sciences, and if history is properly taught in the grammar grades, it is one of the most valuable branches for training the reasoning powers.

5. To direct the reading of the pupils. The breadth of the subject requires extensive reading on the part of the pupils, if they would acquire a comprehensive knowledge of history. This reading cannot all be done while they are pursuing the work as provided by the course of study or during their period in the public schools, but the proper use of supplementary reading and careful direction by the teacher will lead most pupils to acquire a love for the reading of historic works, and this love once acquired, it will lead to the continuance of historic study after the work of the school is finished.

6. To strengthen character. The study of the lives and characters of the great leaders of our own and other nations never fails to exert an ennobling influence upon the pupils and to give them an inspiration to attain high ideals and to live pure lives. This is the most important of all the results to be obtained from this study. In short, all that has been said under *Purposes* can be summed up in this: The purpose of teaching history is to make good citizens.

**PREPARATION OF THE TEACHER.** In order that the above purposes may be attained, the teacher of history needs an adequate preparation for the work. This preparation should include:

1. A thorough knowledge of the subject, including its relation to other subjects, and especially to geography.

2. A knowledge of the methods of teaching. See METHODS OF TEACHING.

3. Ability to direct pupils in their study of history, especially in the use of supplementary matter, such as reference books and books for collateral reading.

4. Ability to present the subject in a clear, vivid and interesting manner. This preparation can be obtained in professional schools, such as normal schools and colleges, in a measure in the public schools, provided the pupil is under a good teacher, and in a great measure by self study. The knowledge of history that the teacher should have as a foundation for her work must far exceed a knowledge of the facts that she expects to teach, for without this extensive knowledge she will be unable to make

## History

a wise selection of facts or to present them in their proper setting.

The work in history in the public schools naturally divides itself into three groups, that of the primary grades, that of the intermediate grades and that of the grammar grades.

**PRIMARY GRADES.** The teaching of history in the first and second grades should be wholly oral and should consist of history stories. These may be biographies, which include the boyhood of eminent men, such as Washington, Lincoln and Columbus, or the stories of certain phases of history that the children can easily understand. These will include stories of exploration, such as a brief account of John Smith, including the settlement of Jamestown and the story of Pocahontas; stories of invention, such as the invention of the cotton gin and the steamboat, and accounts of the manners and customs of the early colonists. These stories should be told by the teacher and after they have been repeated two or three times, reviews should be conducted, in which the pupils should tell back to the teacher the stories to which they have listened. As far as possible, the children should tell the story in a connected form. This gives training in language as well as in history. In the preparation of these stories the teacher should use care to keep them within the capacity of the pupils, to present them in such a way as to make them attractive and to enable the pupils to understand fully everything that is narrated. In order that this may be done, the teacher should prepare the story with a view to the facts that will be presented, to the language that is to be used and to the time required. Young children will listen to a vivid account for eight or ten minutes, but when the account is prolonged beyond this time many of them become inattentive; hence the story should be short and pointed.

In the third grade the stories told by the teacher should be supplemented by reading on the part of the pupils. If it is impossible to procure books for the pupils to read, the teacher should read from such suitable books as she can obtain. A good illustration of the class of books valuable for pupils of this grade is found in the following list: Edward Eggleston's *Stories of Great Americans for Little Americans* and *Stories of American Life and Adventure*; Mary Hall Husted's *Stories of Indian Children* and Annie Chase's *Children of the Wigwam*. Among biographies valuable for this grade are found Jesse R. Smith's *Life of Washington*;

## History

James Baldwin's *Benjamin Franklin*, also his *Stories of Great Americans*; Frances Perry's *Four American Inventors*, and Anna Holman Burton's *Four American Patriots*. These are fair samples of a large number of books now easily obtainable.

All through these grades the pupils should be taught sentiments of a patriotic nature, including patriotic songs and extracts from such poems as *The Landing of the Pilgrims* and the *Building of the Ship*. In the selection of subject-matter for this work the teacher should be guided almost entirely by the capacity of the pupils, since in grades having a large percentage of children of foreign extraction who are not familiar with English, memory games can scarcely be attempted before the latter part of the second year.

**INTERMEDIATE GRADES.** The work of the intermediate grades is a continuation of that in the first three grades. To the stories told by the teacher there should be added more or less systematic reading of history by the pupils. Such books as Edward Eggleston's *First Book in American History* and Mowry's *First Steps in the History of Our Country* are valuable for systematic reading in these grades. The pupils should also be encouraged to read biographies, provided they can be obtained. A good illustration of biographies suited to these grades is found in Elbridge S. Brooks's *Columbus, Franklin, Decatur and Grant*, and Louise Putnam's *Life of Abraham Lincoln*.

Thus far these suggestions have dealt only with American topics. In some schools it may be unwise to go beyond these, but whenever the capacity of the pupils and the work in the course of study will allow it, the children of the intermediate grades, especially of the fourth and fifth, should obtain some knowledge of other people. If the pupils can obtain the books, they should read during this time the following and as many more as opportunity will permit: Jane Andrews's *Ten Boys on the Road from Long Ago to Now*, Guerber's *Story of the Greeks*, *Story of the Romans* and *Story of the Chosen People*. These are typical of a number of other works of similar nature, which can be used at this time to great advantage. The reading of this period should also include considerable biography, not only of Americans, but of the great men of other nations. Particularly suitable for these grades are Sarah Bolton's *Lives of Girls Who Became Famous* and *Lives of Poor Boys Who Became Famous*. Many other books



of a like nature are easily obtainable, and in towns and cities school libraries are usually well supplied with material of this sort. If the pupils cannot obtain books, it is of great advantage in the history work for the teacher to possess them and read from them. The memory gems during this part of the work should be emphasized, and a large number of extracts from poems, orations and other utterances of public men should be memorized, care being taken to see that the pupils understand a selection before learning it.

**GRAMMAR GRADES. *Text-books.*** The systematic study of history usually begins in the seventh or eighth grade, where the text-book is introduced, and it is at this point that the teacher frequently meets her greatest difficulty. The book should be carefully studied by the teacher, its plan ascertained and the difficult points discovered. This should be done before any work is begun with the class. When the teacher is familiar with these difficulties, she should plan her work so as to remove them as far as possible from the pupils. This can be done first by teaching the pupils how to study history from a text-book. A good plan is to use the book in class for a few lessons, asking the pupils to read and discuss the paragraphs assigned, pointing out to them in this way what they are expected to retain from their study. They should learn the facts and the relation of these facts to one another, but they should not attempt to commit the text to memory. Care should also be taken in the assignment of lessons so that the important paragraphs may be properly emphasized and the unimportant ones passed over lightly. In case the advance lesson contains any point that the pupils will have difficulty in understanding, the matter should be explained at the time of the assignment of the lesson. If other works are to be consulted, specific directions for their reading should be given. These directions should often include the page and the paragraph of the work to which the pupils are referred. The teacher should so plan the recitation as to make the history appear a live subject. In this way the interest of the pupils will at once be secured and retained.

***Cause and Effect.*** History is a logical sequence of events, each depending upon certain causes and becoming a cause upon which events that follow are based; therefore, history should be studied from the standpoint of cause and effect. In proceeding according to this plan, special

emphasis should be placed upon the relation of geography to history. The teacher should lead the pupils to see that all great movements of history have rested upon geographic conditions and have been determined by them. A good illustration is the relation of the geography of North America to its settlement by the English and French colonists. Why did the French penetrate so much farther inland and range over so much larger territory than the English, during the same period? Why did the English settle in compact communities, while the French failed to establish many settlements? The answer to these questions is based very largely upon the geographical conditions. The Saint Lawrence formed a waterway leading far inland, by means of which the Great Lakes and the Mississippi Valley were reached with comparative ease, while the barrier of the Appalachian Mountains was an obstruction that the English colonists could not overcome for more than a century. Again, the purpose that led to colonization by each of these nationalities was an important cause in determining their method of life in the New World. The English came because they wished to establish a home wherein they would be free from all restrictions in carrying out the form of worship that they believed to be true. The French were actuated by the desire to acquire wealth through trading with the Indians, and they could not do this successfully if they remained in settled communities and devoted their time to tilling the soil. All events are susceptible of similar treatment, and the connection between cause and effect should never be overlooked.

***Maps.*** Maps should be constantly used in connection with the text-book in history, and it is an advantage to the class if they have been used in the lower grades in connection with some of the narratives. It is a good plan to have the pupils construct the map as the study proceeds. When outline maps are used, this can be done without consuming much time, and it is of great assistance in enabling the pupils to understand the geographic relations.

***Dates.*** Only the important dates should be memorized, such as the discovery of America by Columbus, the settlement of Jamestown, the landing of the Pilgrims, Braddock's expedition and the capture of Quebec by the English. The tendency is to have the pupils memorize too many dates, and this is liable to lead to confusion.

***Outlines.*** The skilful teacher will either con-

struct for her class or direct them in the construction of an outline of the subject as the study proceeds. These outlines should not be elaborate, but they should show the relation of one event to another, should include the dates to be memorized and should be so constructed as to form the basis of review lessons.

*Government.* The underlying principles of government should be taught in connection with the history in the eighth grade, and these should be discussed and explained as they are reached in the regular course of study, as the difference between the royal and proprietary governments in the colonies previous to the Revolution. The difference in political principles which arose between the colonies and Great Britain and finally led to the Revolutionary War should be thoroughly discussed, and so much of these principles as is necessary to give the pupils a clear understanding of the points at issue should be learned.

*Wars.* In the study of wars the causes leading to the war and the results arising from it are far more important than the military campaigns. The tendency is to place too much stress upon the campaigns and battles, consuming so much time in this branch of study that but little time is left for the study of the more important features. In general, the military history of wars should be studied by campaigns. One campaign can be thoroughly studied as a type and the others passed over lightly. A good type is Burgoyne's campaign in the Revolutionary War, the study of which should include the purpose for which it was organized, the army with which he started, the conditions of the country through which he passed, the causes that led to his defeat and the results following his capture. The campaign terminating in the Battle of Gettysburg in the Civil War is also excellent for systematic study. Minor battles should usually be ignored, unless they constitute the beginning of a chain of events that lead to important results.

*Supplementary Work.* No text-book contains a sufficiently full account of American history to make the subject interesting, and it should be supplemented by additional reading and research. To this end the teacher of history should be able to place before the pupils such reference works and other books related to the subject as will enable them to follow out the study along various lines. Many of these works partake of the nature of fiction, but they are no less valuable. The libraries are so well stocked

with them that the problem before the teacher is one of selection. A good illustration of what such a list of books should contain is given herewith: Samuel Fallows's *Story of the American Flag*; James Baldwin's *Discovery of the Old Northwest*; Elbridge S. Brooks's *Century Book of Famous Americans*, also his *Century Book of the American Revolution*; Charles Carleton Coffin's *Boys of '76* and *Old Times in the Colonies*; John Fiske's *The War of Independence*; Guerber's *Story of the Great Republic*; Reuben Goldthwaites's *The Colonies*; Albert Bushnell Hart's *Formation of the Union*, and Woodrow Wilson's *Division and Reunion* (these last three books should be on every teacher's desk); O. P. Austin's *Uncle Sam's Secrets* and Eva March Tappan's *England's Story*.

The teacher will get valuable assistance from Channing and Hart's *Guide to American History*, Allen's *Topical Studies in American History*, Brigham's *Geographic Influences in American History*, McCoun's *Historical Geography*, McMurry's *Special Method in History* and Hinsdale's *How to Study and Teach History*.

**Hitchcock**, EDWARD (1793-1864), an American geologist, born in Deerfield, Mass. At the age of twenty-two he became principal of Deerfield Academy, which position he held for three years. His first work, which brought him into public notice, was his compilations of the calculations for the *Farmers' Almanac* and *Nautical Almanac*. After four years as pastor of a Congregational church, he became professor of chemistry and natural history in Amherst College and later became president of Amherst and also filled the chair of natural theology and geology, which position he held for ten years, being responsible to a great degree for the progress made by the institution at that time. He was recognized at one time as one of the leading authorities on geology in the United States and he did much to popularize the subject. The American Geological Society was formed at his suggestion, and he was its first president. Some of his important works are *Geology of the Connecticut Valley*, *The Religion of Geology and its Connected Sciences*, *Religious Truths Illustrated from Science*, *Religious Lectures on the Peculiar Phenomena of the Four Seasons* and *A Wreath for the Tomb*.

**Hitchcock**, ETHAN ALLEN (1835-1909), an American politician, born in Mobile, Ala. He settled in Saint Louis as a merchant and in 1866 became a partner in the commission house of Oliphant & Company in China. He retired in



## Hittites

1872 and returned to the United States two years later, becoming interested in various manufacturing, mining and railway enterprises. He was made minister to Russia in 1897 and was the first American ambassador to that country. President McKinley appointed him secretary of the interior in 1898 and he was reappointed in 1901 by President McKinley and President Roosevelt and again in 1905. He was a member of the board of trustees of the Carnegie Institution, Washington, at its foundation.

**Hit'tites**, a Canaanitish nation first mentioned in connection with Abraham, who bought the field and cave of Machpelah from them. There are notices of them in Palestine during and after the captivity. Egyptian and Assyrian inscriptions seem to indicate that the nation consisted of a confederacy ruled by a number of chiefs. At one time a Hittite empire extended over a large area in Asia Minor and Syria and was constantly at war with Egypt, fighting great battles with Seti I and Rameses II.

**Hives**, *hivex*, the common name for urticaria, a disease which appears in white, swollen patches on the skin, that turn red after the patient scratches them. They are accompanied by itching which, in severe cases, becomes almost intolerable. The attacks appear and disappear with great suddenness. Local application of a solution of baking soda will sometimes relieve the itching, but the cure comes by the removal of the causes, which are usually from some disturbance of the system, such as indigestion, caused by the eating of fish, pork or some fruits. Such local causes as the stinging of nettles will in some persons produce an attack of this disease, which is therefore known as *urticaria*, or *nettle rash*. A similar disease is seen in the bites of such insects as mosquitoes and fleas.

**Hoang-Ho** or **Hwang-Ho**, *hwahng'ho* (Yellow River), a large river in China, the sources of which are in mountains in the Kuku-Nor territory, north of Tibet. It flows in a winding course in a generally easterly direction into the Gulf of Pe-chi-li. Its length is estimated at about 2600 miles, and it drains an area of probably 400,000 square miles. The Hoang-Ho is navigable only a short distance from its mouth. It derives its name from the vast quantities of yellow earth held in a state of solution by its waters. This dirt, being deposited, raises its bed to such an extent that it frequently overflows, causing great loss of life and property. It is the second river in China in size, the Yang-tse-kiang being larger.

## Hobbema

**Hoar**, *hore*, EBENEZER ROCKWOOD (1816-1895), an American jurist, born at Concord, Mass. He was graduated at Harvard in 1835 and was admitted to the bar. In 1849 he became a judge of the court of common pleas and ten years later was made justice of the state supreme court. In 1869 he was chosen attorney general of the United States, was one of the representatives of the United States in the conference which framed the treaty of Washington and was a member of Congress from 1873 to 1875.

**Hoar**, GEORGE FRISBIE (1826-1904), an American statesman, born in Concord, Mass. He was graduated at Harvard, began the practice of law in 1849, entered politics as a Free-Soiler, joined the Republican party at its organization, was elected to the legislature in 1852 and was a member of Congress from 1869 to 1877. He served on the Electoral Commission in 1877 and in the same year was elected to the United States Senate. He was four times reelected, becoming conspicuous as a consistent opponent of anti-imperialism, for notable service on important committees and as an eloquent orator.

**Ho'bart**, the capital of Tasmania, on the west shore of the Derwent River, 12 mi. from the coast. The most noteworthy buildings are the government house, the townhall, the public library, the parliament buildings, the royal theater and the museum and art gallery. As the harbor is excellent, the town is the center of a considerable trade, both import and export. There are manufactures of beer, flour, soap, jam, hats and barrels. As the temperature is never extreme and the region is very healthful, Hobart is a favorite Australian summer resort. Population in 1911, with suburbs, 39,937.

**Hobbema**, *hobe'ba mah*, MEINDERT (1638-1709), a Dutch painter. The place of his birth is unknown, but he spent most of his life at Amsterdam, where he probably studied under Ruysdael. During his lifetime his work was not appreciated, but since his death his landscapes have been ranked by critics second only to Ruysdael's among the painters of the Dutch school. Hobbema differed from Ruysdael in choosing as subjects the gentler aspects of nature, such as woodland scenes and quiet pools. In technical skill he probably excelled Ruysdael. His colors are rich and transparent and depict with especial brilliancy the beautiful effects of sunlight. Among his famous paintings are *The Water Mill*, in the Glasgow Gallery; *The Avenue near Middelharnis*, Holland, in the National

## Hobbes

Gallery, London, and *The Ruins of Breberode Castle*, also in the National Gallery.

**Hobbes**, *hobz*, JOHN OLIVER. See CRAIGIE, PEARL RICHARDS.

**Hobbes**, THOMAS (1588-1679), an English moral and political philosopher. The most remarkable of his works is his *Leviathan, or the Matter, Form and Power of a Commonwealth*. In the history of the development of free thought in Europe, Hobbes holds an important place, and he was one of the first great English writers on government. He conceived the state of nature to be one in which all are at war with one another, and government as the result of a compact, suggested by selfishness, for the sake of peace and protection.

**Hob'kirk's Hill**, BATTLE OF. See CAMDEN, BATTLES OF.

**Ho'boken**, N. J., a city in Hudson co., on the Hudson River, at the base of the Palisades, opposite New York, of which it is a suburb, and adjoining Jersey City, on the Delaware, Lackawanna & Western, the New Jersey Junction, the Erie and the West Shore railroads. The city is the seat of Stevens Institute of Technology. There are also a public library, Saint Mary's Hospital and other prominent buildings. Hoboken is a great center for shipping, especially of coal, and is the terminus of many important transatlantic steamship lines. Among the important manufactures are machine shop products, leather goods, silk, wall paper and caskets. It was first called Hobocan Hacking and was a part of the patroonship granted to Marco Pauw in 1630. A house was built about ten years later, and a sparse settlement grew up. The present city really dates from 1804, when John Stevens, "the founder of Hoboken," bought the land and laid out the town. It was incorporated in 1849. In 1900 Hoboken was the scene of a terrible disaster; a fire at the wharves of the North German Lloyd Steamship Company caused a loss of 200 lives and of property valued at \$5,000,000. Population in 1910, 70,324.

**Hobson**, RICHMOND PEARSON (1870- ), an American naval officer, born at Greensboro, Ala.; graduated from the United States Naval Academy at Annapolis in 1899. At the opening of the Spanish-American War he was with Admiral Sampson's fleet. After the Spanish squadron was located in the harbor of Santiago Lieutenant Hobson conceived the plan of sinking a ship in the narrow entrance to the harbor and thus preventing the escape of the fleet. With seven companions he took the collier *Merrimac* into the

## Hockey

entrance of the harbor on Friday morning, June 3, 1898, and sunk the boat in the channel, but did not accomplish the desired result. He was picked up by a Spanish boat and retained as prisoner of war



RICHMOND P. HOBSON

until exchanged a few weeks later. After the war he was sent as a naval constructor to the Philippines. In 1903 he resigned from the navy. In 1908 he was elected to the House of Representatives from Alabama. He was re-elected in 1910 and 1912.

**Hock'ey** or **Shinney**, a ball game in which each player is armed with a *hockey*, or *shinney*, *stick*, with which he tries to drive a small ball through the team of his opponents to their goal line. The field should be from 300 to 400 feet long and about 200 wide feet. At the beginning of the game the players, except one from each side, stand with their backs to their own goals and about one-third of the distance from them toward the center of the field. The ball is laid on the ground in the center of the field, and one player from each side stands facing his opponent's goal in the most favorable position to drive the ball towards it. Each player places the head of his hockey stick against the ball on the side opposite his opponent's goal, and at a given signal each of the players tries to strike the ball in the direction he wishes it to go. The game is now on, and every player must do his best under the rules to drive the ball over the goal line of his opponents. The rules of this game have not been rigidly formulated, as have those



## Hoe

of basket ball and football, and accordingly the game varies a great deal in different localities, especially in the method of starting. In fact, the game is one of the rough-and-tumble games that any number of boys play during the fall and winter months when they happen to meet in a suitable place. Hockey is also played on the ice, and this form of the game has been more carefully organized and is now a recognized winter sport in schools and colleges, many of which support hockey teams that play inter-collegiate matches with their neighbors. See ATHLETICS.

**Hoe**, an agricultural tool for cultivating and stirring the soil and for clearing out weeds. Hoes are of two kinds, those in which the blade is at right angles to the handle, used for turning over the earth, in place of the spade, and those in which the blade is almost in the same line with the handle, used almost exclusively for killing weeds and for stirring the surface of the earth.

**Hoe**, RICHARD MARCH (1812-1886), an American inventor, born in New York City. He was the inventor of the rotary printing press, having introduced in 1846 the Hoe Lightning Press. Later he and his brother invented the web-perfecting press, now in general use in the printing of newspapers. See NEWSPAPER; PRINTING PRESS.

**Hofer**, ANDREAS (1767-1810), a celebrated Tyrolean patriot. In 1796 he led a body of his countrymen against the French, and during the rest of his life was engaged almost continuously in defending his native country against the aggressions of surrounding nations. He gained notable successes against vastly superior forces and for a time, in 1809, actually freed his country from foreign yoke and acted as the head of the government. But soon his force was overpowered by French and Bavarians, and Hofer was betrayed into the hands of the French. After a court martial, he was condemned to death and shot by order of Napoleon.

**Hoffman**, CHARLES FENNO (1806-1884), an American poet and novelist, born in New York City. He edited the *American Monthly Magazine* and the *New York Mirror* and published *Greyslaer*, a novel, *The Vigil of Faith* and *Other Poems* and a number of songs. During the last thirty-five years of his life he was insane and was confined in an asylum.

**Hofmann**, *hofs'man*, HEINRICH (1824- ), a German painter, born in Darmstadt. He studied at Düsseldorf and Antwerp Academy and had Schadow for a teacher. After traveling in Italy he settled in Dresden in 1862. His pic-

## Hogarth

tures illustrating scenes from the life of Christ are most widely known, as, *Christ Taken Prisoner* and *Christ in the Temple*.

**Hofmann**, JOSEF (1877- ), a Polish pianist, born in Warsaw, of musical parentage. He studied with his father, then with Rubinstein. He made his début when six years old, toured Europe at nine and came to America in the following year. Thereafter he retired, reappearing at Dresden in 1894, and has since made several successful Continental and American tours.

**Hog**, a common domestic animal, belonging to the same family as the boar. The head is prolonged into a pointed or truncated snout; the feet have four toes, two of which reach the ground, and the skin is very thick, mostly covered with stiff bristles. The common hog in a tame state is almost universal, except in very high latitudes. The prevailing color of the domestic animal is a dull yellowish white, sometimes marked irregularly with black and sometimes totally black. It is omnivorous in its habits, devouring almost any vegetable or animal substance. It is also very prolific, has usually two litters in a year, a litter consisting of from ten to twenty. Its flesh, known as *pork*, forms a material part of the food of mankind, though Jews are strictly enjoined not to eat it, and Mohammedans agree in this prohibition. Pork takes salt better than almost any other meat, and hence it forms an important article in military and naval stores. The lard of the hog is used in a variety of preparations, and the bristles are used in large quantities in the manufacture of brushes, while the skin, when tanned, is used by saddlers and bookbinders. The hog is erroneously looked on as a peculiarly stupid and gluttonous animal; it has also an undeserved reputation for filthy habits, but the too common filthiness of pigsties is more the fault of the owner than the tenant. It wallows in the mire, but this is a peculiarity of all animals having a thick skin, and they do it to cool themselves and provide a protection against insects. The wild boar, from which most of our domesticated varieties are derived, is found in most parts of Europe and Asia. In size the wild animal considerably exceeds the domesticated hog; the legs are longer and more muscular, and the back is therefore much higher. See LARD; PORK.

**Hogarth**, WILLIAM (1697-1764), an English painter and engraver, born in London. He began his career as a silversmith, making designs for plates. He made many designs of engrav-

## Hogshead

ings, the most important of which were *Masquerades and Operas* and illustrations to Butler's *Hudibras*, which brought him fame. His ambition was to be a line engraver, but in 1724 he took up the study of painting. Among his successful series of paintings are *The Harlot's Progress*; *A Rake's Progress*; *Marriage a la Mode*, his most famous work, and another, *Industry and Idleness*, the last of which consists of engravings. In his work Hogarth had a definite purpose to fulfill, and this was to represent the vices and foibles of society. His paintings are better than his engravings. He also succeeded in portraits, the best of which is one of himself with his dog. Others of his works are *Southwick Fair*, *Midnight Modern Conversation*, *The Distressed Poet* and *Sigismunda Weeping over the Heart of her Husband*.

**Hogs'head**, an obsolete measure of capacity in the English system, containing 63 old wine gallons or  $52\frac{1}{2}$  imperial gallons. It varied in different times and places and for different substances. For beer it was 54 gallons, for rum, 40 to 50 gallons, for brandy, 45 to 60 gallons. In the United States, the measure is still in use, being equivalent to 63 American gallons or 52.485 imperial gallons; for tobacco it varies from 750 pounds to 1200 pounds in different states.

**Hohenlohe-Schillingsfürst**, *ho'en lo'e shil'-lings fürst*, CHLODWIG KARL VICTOR, Prince of (1819-1901), chancellor of Germany. In 1869 he became prime minister of Bavaria, and he was vice-president of the first imperial parliament in 1871. He was sent as German ambassador to Paris in 1874 and was a member of the Congress of Berlin in 1878. In 1894, on the resignation of Caprivi, he became chancellor of the Empire, and he held this office for six years.

**Hohenstaufen**, *ho'en stowf'en*, the dynasty which ruled Germany from 1138 to 1254. The first of the House was Conrad III, who came to the throne on the death of Lothair of Saxony. The other kings of the line were Frederick I, Barbarossa; Henry VI; Otho IV; Frederick II, and Conrad IV, whose death in 1254 brought the rule of the House of Hohenstaufen to an end. The Hohenstaufens were, for the most part, strong kings, and the imperial title was with them something more than a name. The two Fredericks were among the most remarkable of medieval sovereigns.

**Hohenzollern**, *ho'en tsole'urn*, a princely family of Germany, now represented by the

## Holden

royal family. It dates from about the ninth century, and its history consists of an account of the several branches into which at various times it was divided. In 1415 the representative of the younger line, Frederick VI, was made elector of Brandenburg and thus founded the present imperial dynasty of Prussia. See PRUSSIA, sub-head *History*.

**Holbein**, *hole'bine*, HANS, the Elder (1460?-1524), a German painter, the father of the famous Hans Holbein. Not much is known of his life. He was born at Augsburg and in 1499 went to Ulm and later to Frankfort. His style is founded on the models of the early Flemish school, but he shows traces of Italian influences in his later works. All the works of his early period show the Flemish influence, and among these are *Virgin and Child with Two Angels*, *Virgin and Child Enthroned with Angels*, *Coronation of the Virgin*, *Nativity*, *The Last Supper*, *Expulsion of the Jews from the Temple*, *Crucifixion* and an *Entombment*. To the later period, in which the Italian influence is evident, belong *Life of Saint Paul*, *Saint Catharine*, *Martyrdom of Saint Sebastian* and *Fountain of Life*.

**Holbein**, HANS, the Younger (1497-1543), an eminent German painter, born at Augsburg, where he was first taught by his father, who was also a painter. His youth was spent in Basel, but at the beginning of the Reformation he went to England, where letters from his friend Erasmus, whose *Panegyric on Folly* he had illustrated by a series of drawings, procured him the patronage of the chancellor, Sir Thomas More. He was appointed court painter by Henry VIII; and in the Windsor collection he left portraits of all the eminent Englishmen of the time. The most celebrated of his pictures is the *Madonna of the Burgomaster Meyer* at Darmstadt. Other works are *Passion Scenes*, *The Ambassadors* and various excellent portraits.

**Holden**, EDWARD SINGLETON (1846- ), an American astronomer, born at Saint Louis, Mo., and educated at Washington University and the United States Military Academy. After a term of eight years as professor of mathematics at the naval academy and four years as director of the Washburn Observatory at Madison, Wis., Holden became president of the University of California in 1885 and later director of the Lick Observatory on Mount Hamilton in California. Here, surrounded by all the conveniences which modern science could furnish, he did his most important work which



## Holder

is considered of great value to the science of astronomy. Among his works are an *Index Catalogue of the Nebulae*, *A Life of Sir William Herschel*, an *Astronomy* (with Newcomb) and *Essays in Astronomy*.

**Holder**, CHARLES FREDERICK (1851- ), an American naturalist and author, born at Lynn, Mass., of Quaker parents, and educated at the Friends' School in Providence, R. I. He entered the United States Naval Academy at Annapolis, but resigned before his graduation. In 1871 he became assistant curator of zoölogy in the American Museum of Natural History in New York, and his important scientific researches led to his election to the New York Academy of Sciences and other famous scientific societies. He traveled extensively in America, collecting specimens for the museum, and finally removed to California, where he took a prominent part in the educational affairs of the state, becoming president of the Pasadena board of education and later, professor of zoölogy in Throop University. Among his published works are *Marvels of Animal Life*; *Elements of Zoölogy*; *The Pasadena Highlands*; *Charles Darwin's Life and Work*; *Louis Agassiz, His Life*; *Stories of Animal Life*; *Big Game at Sea*, and others.

**Hol'iday**, any day set apart as a religious or national festival; in a general sense, a day or a number of days during which a person is released from his every-day labors. In the United States the principal holidays are New Year's Day, Washington's Birthday, Decoration Day, the Fourth of July, Labor Day, Thanksgiving Day and Christmas; but nearly every state has its particular festivals and holidays. There is no national legal holiday in the United States, each state controlling this matter for itself.

**Holinshed** or **Hollingshead**, *hol'inz hed*, RAPHAEL (?-1580), an English writer, known chiefly as the author of the famous *Chronicle*, or the history of England, Scotland and Ireland, which furnished the material for many of the dramas of the Elizabethan time, notably of Shakespeare's *Macbeth*, *King Lear* and *Cymbeline*, besides parts of others.

**Holland**, MICH., a city in Ottawa co., 25 mi. s. w. of Grand Rapids, on the Pere Marquette railroad, and at the head of Black Lake, which affords a good harbor. It is in an agricultural region which was once a lumber district and has an extensive grain trade. The industries include flour and planing mills, tanneries, beet sugar factories, pickling plants and manu-

## Hollyhock

factories of wood-working machinery, launches, furniture, baskets and other articles. The place was settled by the Dutch in 1847, and the present inhabitants are largely of Dutch descent. It is the seat of Hope College and of the Western Theological Seminary, both under the Reformed Church. A number of summer resorts are situated near the city, on Black Lake. Population in 1910, 10,490.

**Holland**, JOSIAH GILBERT (1819-1881), an American author and editor. In 1844 he graduated at the Berkshire Medical College, but he never succeeded in gaining a practice. At the age of thirty he connected himself with the *Springfield Republican*, and as he exhibited a remarkable aptitude for journalism, the paper soon became vastly popular. In 1870 he founded *Scribner's Monthly*, which, under another ownership, is now the *Century Magazine*. Among Holland's books, many of which became very popular, are the novels *Nicholas Minturn* and *Arthur Bonnicastle* and the poems *Bittersweet*, *Kathrina* and *Garnered Sheaves*.

**Holland**, KINGDOM OF. See NETHERLANDS, THE.

**Holly**, a genus of plants embracing a number of evergreen trees or shrubs. The common European holly is a handsome, conical evergreen tree, growing to the height of twenty or thirty feet. Its leaves are dark green, shining and leathery, abundantly armed with prickles on the lower branches, but free from them on the upper branches and on very old trees. The flowers are white, appearing in May; the fruit is red, ripening in September and remaining on the tree all winter. A good many varieties are known, distinguished by the shape and color of the leaves, which are sometimes spotted or edged with yellow. Holly is excellently adapted for hedges and fences, as it bears clipping. The wood is hard and white and is employed for turnery work, knife handles and similar articles. Among the Romans it was customary to send boughs of holly to friends with new year's gifts, as emblematic of good wishes; and it is used to decorate houses at Christmas. The American holly is widely spread throughout the United States. It sometimes attains a height of eighty feet, with a trunk four feet in diameter.

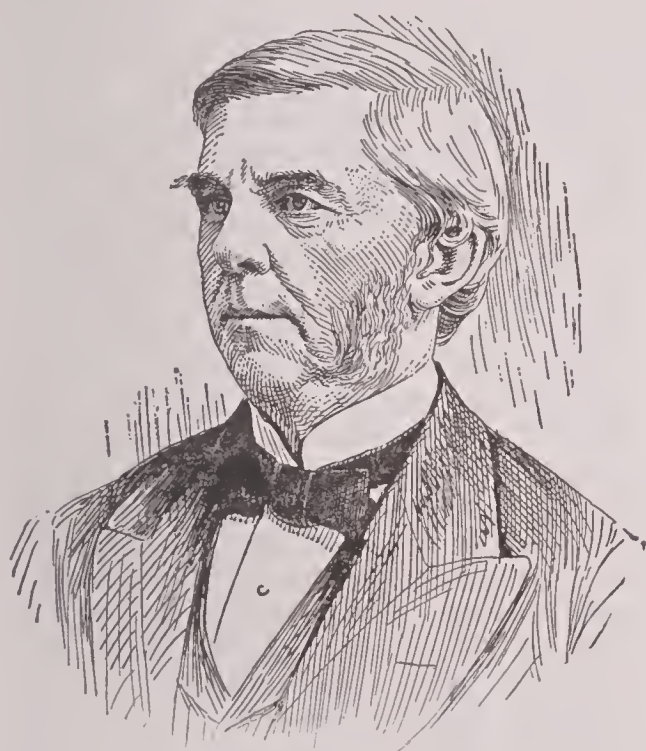
**Hollyhock**, a biennial plant, native of China, a frequent ornament of gardens. There are many varieties, with single and double flowers, showing tints of yellow, red, purple and dark purple, approaching to black. Hollyhocks grow to the height of eight feet or more,

## Holman

and some of the double ones are quite as beautiful as dahlias and chrysanthemums.

**Holman, WILLIAM STEELE** (1822-1897), an American jurist and politician, born in Dearborn County, Ind., and educated at Franklin College. He became a lawyer and held several state judicial offices and in 1851 was a member of the legislature. In 1859 he was elected to Congress, and with two or three exceptions, as in 1876 and 1878, retained that position. He was known as "the watchdog of the treasury" and "the great objector," from his invariable opposition to wasteful public expenditures.

**Holmes, OLIVER WENDELL** (1809-1894), an American author and physician, born at Cam-



OLIVER WENDELL HOLMES

bridge, Mass. During his early years he spent much time in his father's library, and the great quantity of fragmentary reading which he did "in books rather than through them," as he himself said, had a marked effect on the writings of his later life. He was graduated from Harvard in 1829, in the class which he himself made famous in later years by his yearly poems at the reunions. After studying law for a time, he turned to medicine, at first with little seriousness. He became deeply interested, however, and the years during which he studied medicine in Paris were most industriously spent. His degree of M.D. was received in 1836 and he settled down to practice medicine in his loved city of Boston, where he remained for the rest of his life.

## Holmes

While yet in college, Holmes had written numerous poems which, while they were not of the highest order of merit, included such popular and humorous poems as *The Spectre Pig* and *The Height of the Ridiculous*; he had also won a taste of fame by the publication in the year following his graduation from Harvard of *Old Ironsides*, which, by its remarkable popularity and the feeling it stirred up throughout the country, had the effect of compelling the secretary of the navy to countermand the order for the destruction of the famous frigate *Constitution*.

It was not until 1836 that Holmes published his first book of poems. He realized that the appearance of a volume of poetry in the same year that he started in to practice medicine would probably have a most unfavorable effect on his practice, as people might hesitate somewhat before applying to a poet for prescriptions. His heart was set, however, on a literary career, even more than on a medical, and he was willing to sacrifice something for it. In 1839 he was given a position as lecturer in Dartmouth College and in 1847 gave up his practice entirely and became professor of anatomy at the Harvard Medical School, a position he filled until 1882. Meanwhile, in 1840, he had married Amelia Lee Jackson, with whom his life was most happy. Various medical papers, some of which were of great importance in the profession, came from Holmes's pen from time to time, and his poems written to celebrate every special occasion in his beloved city of Boston had made him locally famous as a wit. It was not until the founding of the *Atlantic Monthly* in 1857, however, that Holmes became widely famous. To this newly-founded magazine he contributed his papers known as the *Autocrat of the Breakfast Table*, which are up to the present day considered his masterpiece. It is simply talk in print, and this means a great deal when the talker is as brilliant and easy a conversationalist as was Doctor Holmes. This first series was followed by *The Professor at the Breakfast Table* and later by *The Poet at the Breakfast Table*. Three novels, *Elsie Venner*, *The Guardian Angel* and *A Mortal Antipathy*, added little to his fame, although the first two are still distinctly readable. After a visit to Europe in 1886 appeared *Our Hundred Days in Europe*, and when Holmes was eighty, he wrote a final *autocrat* series under the title of *Over the Teacups*. This last possesses little of the spontaneous charm of his earlier writings, but is



## Holmes

interesting as showing the change in his conversational methods and powers.

Among Holmes's best poems may be mentioned *The Chambered Nautilus*, *The Last Leaf* and the widely-known *Wonderful One-Hoss Shay*. Whether it is as poet or a prose writer that Holmes is considered, it is the same qualities, his sprightliness, his geniality, his absolute sanity and his power of combining wit and pathos, which stand out most prominent, and these are the same qualities which in his own generation made Doctor Holmes the most popular of men.

**Holmes**, *hohmz*. OLIVER WENDELL, JR. (1841– ), an American jurist, born at Boston, the son of Oliver Wendell Holmes, the noted poet and essayist. He was graduated at Harvard and from Harvard Law School, served for two years in the Civil War, taking part in the battles of Ball's Bluff, Antietam and Fredericksburg, and then engaged in practice in Boston, where he became editor of the *American Law Review* and, in 1882, professor of law in Harvard Law School. In the same year he was appointed associate justice and in 1899 chief justice of the state supreme court. In 1902 he was appointed associate justice of the Supreme Court of the United States. He is the author of several books on the law and once edited Kent's *Commentaries*.

**Hol'othu'rian**. See SEA CUCUMBER.

**Holst**, *hohlst*, HERMANN EDUARD VON (1841–1904), a German-American historian, born in Livonia of German parents. He was educated at Heidelberg, taught for a time in Saint Petersburg and then emigrated to the United States. After some years spent in New York in teaching and in newspaper work he returned to Germany, was made professor in the University of Strassburg and later in the University of Freiburg. In 1892 he was made the head of the department of history in the University of Chicago, a position which he held until 1900, when ill health compelled him to retire. Among his writings are *The Constitutional and Political History of the United States*, *The Constitutional Law of the United States*, and *John C. Calhoun*, in the American Statesmen Series.

**Holt**, JOSEPH (1807–1894), an American jurist, born in Breckenridge, Ky., and educated at Saint Joseph's College and Center College, in his native state. He studied law and began practice, but in 1835 moved to Mississippi, where he gained fame as an orator and poli-

## Holyoke

tician. Under President Buchanan he became postmaster-general and later secretary of war. At the opening of the Civil War he supported the Union and was made judge advocate general at the head of the department of military justice. He presided over the trial of Lincoln's assassins. He retired with the brevet rank of major general.

**Holy Alliance**, a league concluded at Paris, in September, 1815, between Alexander I of Russia, Francis of Austria and Frederick William III of Prussia. It consisted of a declaration, that, in accordance with the precepts of the gospel of Jesus Christ, the principles of justice, charity and peace should be the basis of their internal administration and of their international relations, and that the happiness and religious welfare of their subjects should be their great object. Its real aim, however, was to maintain the power and influence of the existing dynasties, and Metternich, the Austrian minister, gradually obtained the chief authority. The events of 1848 broke up the Holy Alliance.

**Holy Fam'ily**, a name in art, applied to representations of the Mary and the infant Christ, with their attendants. In the sixth century the Byzantine school introduced a type in which Jesus is seated in the lap of the Virgin Mary. Later, the attendant angels were added. A new type was introduced by Cimabue and Duccio, in whose pictures are throne-bearing and adoring figures. Toward the last of the Middle Ages still other figures were represented in the pictures of the Holy Family, such as Saint Anna, the mother of the Virgin; Saint Joseph; the infant John the Baptist, and Saint Catherine. Of all subjects, that of the Madonna and child, unknown in the early Middle Ages, came into the greatest prominence, becoming the favorite theme of the Italian painters of the Renaissance.

**Holy Grail**. See GRAIL, THE HOLY.

**Holy Land**. See PALESTINE.

**Holy League**, the name given to several different alliances in European history, the most important of which was formed in 1576 by the ruling house of France, the pope, the king of Spain and the Parlement of Paris against the Huguenots. See FRANCE, subhead *History*.

**Holyoke**, *hole'yoke*, MASS., a city in Hampden co., 8 mi. n. of Springfield, on the Connecticut River and on the Boston & Maine and the New York, New Haven & Hartford railroads. The river here has a fall of 60 feet, and a dam 1000 feet long has been constructed, so that the city now has probably the most

## Holyoke

extensive water power in New England. Holyoke is especially noted for its paper mills, but there are also manufactories of cottons, woollens, thread, silk, alpaca, machinery, school supplies and various other articles. The city contains a public library, two private hospitals and a contagious disease hospital. It is also an educational center. The city has been one of the pioneers in the east in introducing a system of municipal lighting. Holyoke was settled chiefly by Irish people in the last part of the seventeenth century, and it was for a time called Ireland Parish. It was part of West Springfield from 1786 to 1850, and in 1873 it was chartered as a city. Population in 1910, 57,730.

**Holyoke, MOUNT**, a steep ridge in Massachusetts, 5 mi. s. e. of Northampton, 955 feet above sea level. The view obtained from this summit is one of the finest in the east.

**Holy Roman Empire**, the name given to the State created by Charlemagne, the assumption being that it was a development of the old Western Empire and that Charlemagne was the successor of the Roman emperors. The title *Roman Empire* was first used in 962, when Otho the Great was crowned by the pope, and the word *Holy* was added by Frederick Barbarossa. In theory, all of the Christian countries of western Europe formed part of the Holy Roman Empire, but in reality only Italy and those countries which acknowledged the superiority of the king of Germany belonged to it. The Hohenstaufen emperors possessed something like imperial power, because they were strong monarchs individually, but after their time the term came gradually to be merely an honorary title. In 1804 Francis II took the title of emperor of Austria, and two years later he gave up that of Holy Roman Emperor.

**Holyrood Palace**, the ancient royal palace of Scotland, in Edinburgh. It occupies the site of the old Augustinian abbey of the Holy Rood, which was built by King David I in 1128 at the place where, tradition says, he was saved from a pursuing stag by a miraculous cross, or rood, which came between him and the animal. The palace was rebuilt between 1671 and 1679 by King Charles II of England. It is interesting from a historical standpoint, as the place where Mary Queen of Scots resided and where Rizzio was murdered in 1566.

**Holy Sepulcher**, *sep'ul kur*, CHURCH OF THE. See JERUSALEM.

**Holy Spirit Plant**, an orchid of Central America, known, also, as the *dove plant*, from

## Homer

the resemblance of the united stamens and pistils of the flower to a dove hovering with expanded wings, somewhat like the conventional dove seen in artistic representations of the Holy Ghost. The round, sweet-scented flowers are a creamy white, dotted with lilac on the base of the lip, and are borne in a spike.

**Holy Water**, in the Roman Catholic Church, water which has been blessed by a priest for religious uses. It is sprinkled on the worshippers and the things used in the church and is employed at funerals and other special services.

**Homage**, *hom'aje*, in feudal law, a formal acknowledgment and acceptance of the duties of a vassal, made by a feudal tenant to his lord. The tenant, being ungirt and uncovered, kneeled and held up both hands between those of the lord and there professed himself to be his lord's vassal. He then received a kiss from the lord.

**Homeopathy**, the name of a system of medicine introduced by Samuel Hahnemann of Leipzig. It is a system founded upon the belief that drugs have the power of curing morbid conditions similar to those they have the power to excite, an old belief long ago expressed in the Latin phrase, *similia similibus curantur* (like is cured by like). That the smaller the dose, the better will be its effects is another principle which, however, is not now so generally accepted as formerly by physicians of this school. While the principle has often been carried to ridiculous extremes, the idea has gained a remarkable foothold and has doubtless modified the size of doses given by practitioners of other schools.

**Homer**, the earliest named Greek poet, to whom ancient tradition assigned the authorship of the *Iliad* and the *Odyssey*. Of Homer's life and personality nothing is known, and it has been questioned whether such a person ever existed. Several ancient biographies of Homer are preserved, two of which, their titles state, were written by Herodotus and Plutarch, respectively. It is certain, however, that the statements of authorship are false, and the biographies are valuable only because they show what was the ancient popular tradition concerning the poet. Many towns claimed the honor of being his birthplace, and the names of seven are preserved in an epigram beginning,

"Seven rival towns contend for Homer dead,  
Through which the living Homer begged his bread."

Of these towns, Smyrna seems to have had the strongest claim, Chios coming next. At the



## Homer

latter town was a clan of bards called Homcridae, who transmitted the epics from father to son and claimed Homer as their founder. In one of the *Homeric Hymns*—poems addressed to the gods and because of their similarity in style ascribed to Homer, but probably for the most part of later date—the author describes himself as the “blind bard of rocky Chios.” The tradition of Homer’s blindness was universally accepted. Ancient writers mention the name *Homer* as a



HOMER

pseudonym of the poet, and various interpretations of it are given, the most probable being that it meant “one who puts together.” This gives color to the theory that Homer was not an original poet, but merely a compiler of current lays. The general belief of antiquity seems to have been that Homer was born in Smyrna, lived some time in Chios and was buried in Ios. His date has been variously placed between the beginning of the twelfth century and the beginning of the seventh century B. C. The dialect and a few local allusions indicate that the *Iliad* and the *Odyssey* originated on the Ionian coast of Asia Minor and the Aegean Islands. Lyeurgus is said to have brought them to Sparta, and we hear of the recitation of them by rhapsodists about 600 B. C. Solon regulated such recitation at Athens, and the Tyrant Pisistratus had the poems edited by a commission and arranged in what is practically their present form. Perhaps the lays or rhapsodies had previously been sung separately and were then for the first time united into two poems, the *Iliad* and the *Odyssey*.

## Home Rule

**Home Rule**, in British politics, a measure advocated especially in regard to Ireland, the leading feature of which is the establishment of a native parliament in Ireland, to conduct all local and internal legislation, leaving the general political government of the Empire to an imperial Parliament. The movement originated in the formation of the Home Government Association at Dublin, in 1870. The conversion of Gladstone and many members of the Liberal party to Home Rule principles, in 1886, added immense strength to the movement, then under the leadership of Charles Parnell, but failed to carry through its program. In 1893 Gladstone again attempted to secure Home Rule, but the bill was defeated in the House of Lords. The amelioration of economic conditions and the granting of local self-government under Balfour’s Conservative administration, quieted the agitation for a time, but under the leadership of John Dillon, and later of John Redmond, the movement acquired new strength. The general elections of 1910, which gave the Irish members the balance of power in the House of Commons, were interpreted by the Liberals as a complete vindication of the party’s Home Rule program. Accordingly, in 1912 and again in 1913, Asquith introduced a bill providing for Home Rule, but both times it was defeated in the House of Lords. By the terms of the Parliament Act of 1911, any bill which has passed unchanged three readings in three successive sessions of the House of Commons becomes a law without the assent of the House of Lords. The Home Rule Bill was introduced for the third time in the House of Commons on March 5, 1914, and was passed on May 25. The progress of the bill was marked by much bitterness in Parliament, by great enthusiasm in Dublin and vicinity and by the organization of Ulster volunteers and threats of armed resistance in Ulster. In June, the ministry introduced an amending bill, which provided that each county in Ulster might vote on the question whether or not it should be excluded from the operation of the law for a period of six years. Before this amendment could be passed, however, the great War of the Nations broke out, and Parliament passed a new bill postponing the beginning of Home Rule for one year or until the end of the war. See IRELAND, subhead *History*.

In American politics the home rule movement is an attempt to secure complete local self-government by cities, without interference by state legislation. A city and a rural district

## Homestead

have almost no problems in common, and legislation should not be applied indiscriminately to both.

**Homestead**, *home'sted*, PA., a borough in Allegheny co., 8 mi., s. e. of Pittsburgh, on the Monongahela River and on the Pennsylvania and other railroads. One of the largest steel plants in the United States, employing six thousand men, is located here, as are also foundries, machine shops and glass works. The place was settled in 1871 and incorporated in 1880. From July to November, 1892, it was the scene of a great labor strike, in which there was considerable disorder. Population in 1910, 18,713.

**Homestead Laws**, acts concerning the securing and holding of lands and houses for homesteads or places of abode for families. These laws are both state and Federal, the purpose of the former being to protect those who have acquired homes against the claims of creditors, the homestead, to a certain value, usually being exempt from such claims, except those contracted before the property was recorded as a homestead.

The Federal laws relate to the appropriation of the public lands to those who will settle, cultivate and make permanent homes upon them. This privilege is open to any citizen or to any one who declares his intention of becoming a citizen, twenty-one years of age or the head of a family, the appropriation not exceeding 160 acres. Fees are required, rarely exceeding more than \$30, and title to the property is given after three years' residence and cultivation. Preference is shown to ex-soldiers or their heirs. Under these laws more than 85,000,000 acres have been transferred to homestead settlers. See LANDS, PUBLIC.

**Homicide**, *hom'y side*, the killing of one person by another, either through direct act, through instigation or through the omission of some act which would have prevented the killing. In this wide sense it includes manslaughter and murder (See MURDER), besides so-called justifiable homicide. In this article the term will be used only in the last sense. This includes killing by accident, in self-defense, by a public officer in conformity to a judicial sentence, by an officer in performing a legal duty, or by a person to prevent the commission of a serious crime. If committed without any fault on the part of the slayer, homicide is not punishable at law.

**Honduras**, *hon doo'ras*, a republican state of Central America, bounded on the n. by the Caribbean Sea, on the s. e. by Salvador and the Pacific

## Honey

Ocean, on the s. w. by Nicaragua and on the w. by Guatemala. Its total area is about 45,000 square miles, nearly all of which is mountainous. The climate of the interior of the country is healthful, being moderate in temperature and not excessively humid. On the low east coast, the excessive heat and rainfall make life for the white race uncomfortable and dangerous. The mineral wealth of Honduras is very considerable and includes gold, silver, lead and copper. The country also has extensive forests, abounding in fine timber. The principal cultivated products are maize, beans, some wheat, rice, plantains and tobacco. Since 1880 the capital has been Tegucigalpa; the principal ports are Truxillo, on the Caribbean Sea, and Port San Lorenzo, on the Pacific. There is no communication by railroad between the Atlantic and Pacific coasts; transportation is by mule train, the distance of less than two hundred miles being covered in three weeks. The constitution of the state gives the legislative power to a congress of deputies, chosen one for each 10,000 persons. The country is divided, for administrative purposes, into fifteen departments, over each of which is a governor appointed by the president. There is a supreme court. The executive authority is in the hands of the president, elected by popular vote once in four years. Population in 1910, 553,446, exclusive of uncivilized indians.

**Honduras**, BAY OF, a wide inlet of the Caribbean Sea, bordered on the south by Guatemala and Honduras and on the west by British Honduras and Yucatan. Along its shores are the islands of Bonaca, Ruatan, Utila, Turneff, and numerous islets and reefs called cays.

**Hone**, a stone used in sharpening edged tools. The coarse varieties of hones are made of sandstone and are commonly called *whetstones*. The finer varieties are usually made of a stone formed from placing pine logs in the sea and leaving them until they turn to stone. Another variety of hone stone is called *novaculite*. The surfaces of the hone should be smooth and even, and fine stones should be lubricated with oil or water when used. In sharpening any tool upon the hone, the tool should be held firmly and moved back and forth without any rotary motion; otherwise the edge will be rounded and the desired result cannot be obtained.

**Honey**, *hun'y*, a sweet substance collected from flowers by bees and other insects for food for themselves or their young and considered a great delicacy by men. White clover and bass



## Honey Locust

wood furnish very fine honey; buckwheat and other plants may yield as much, but the flavor is always governed by the plant, and in some cases it is not pleasant. Honey has been used for many centuries, and before the cultivation of sugar cane it took the place of sugar for many purposes for which that article is now used. See BEE.

**Honey Locust, Sweet Locust or Black Locust**, a forest tree belonging to the United States. The leaves are divided into numerous small leaflets, and the foliage has a light and elegant appearance. The flowers are greenish and are succeeded by long, often twisted pods, containing large, brown seeds, enveloped in a sweet pulp. This tree is especially remarkable for its formidable thorns, on which account it has been recommended for hedges.

**Honeysuckle**, *hun'y suk'l*, a twining shrub, with distinct leaves and red berries, is native in Great Britain; but two others have been naturalized there, one distinguished by the form of its upper leaves, which are united in a cup, and the other by small, yellowish, scentless flowers and scarlet berries. The honeysuckle family is represented in North America by nine different species. The name is often incorrectly applied to other plants. See COLUMBINE

**Hong Kong**, an island off the southeast coast of China, belonging to Great Britain. It is at the mouth of the estuary that leads to Canton, from which it is 75 mi. distant. It is about 10 miles long, and its greatest width is 7 miles. The island is almost destitute of vegetation. Victoria, the capital, is situated on a beautiful bay and contains most of the population of the colony. There are many beautiful buildings and an excellent harbor, which is strongly fortified. Hong Kong is the center of the foreign trade of China and carries on a large trade with the other great countries. Among the articles of commerce are opium, flour, mercury, ivory, betel, cotton, amber, wools, salt and sugar. There are manufactures of sugar, cotton and vermilion, and among the native industries are ivory carving and metal working. The prosperity of the colony is due in a large measure to the large number of Chinese engaged in trade or in working building stone, which is one of the chief products of the island.

The British occupied Hong Kong in 1841, and the next year it was ceded to England by the Treaty of Nanking. Population in 1911, 366,145, of whom 354,187 were Chinese.

**Honolulu**, *hon'o loo'loo*, the capital of the Hawaiian Islands, on the south side of the Island

## Hood

of Oahu, 2089 mi. s. w. of San Francisco. Its most notable edifices are the palace, the Roman Catholic Cathedral, the treasury, the government buildings, the hospital and the public library. There are foundries, shipyards and manufactories of iron products. There is a fine natural harbor, and Honolulu is rapidly improving. Population in 1910, 52,183.

**Hono'rius**, FLAVIUS (384-423), Roman emperor, son of Theodosius the Great. In the division of the Empire on the death of Theodosius, in 395, Honorius received the western half, but on account of his youth was placed under the guardianship of Stilicho. The principal events of his reign are the adoption of rigorous measures against paganism, the invasion by the Goths under Alaric and another irruption of barbarians under Rhadagaisus.

**Hood**, JOHN BELL (1831-1879), an American soldier, born in Owingsville, Ky. He was educated at West Point and entered the army, but resigned in 1861 to enter the Confederate service. His gallantry in the Virginia campaigns won him a commission as major general. He distinguished himself at Gettysburg and at Chickamauga, where he lost a leg. Afterwards he was made lieutenant general and served with Johnston in the Atlanta campaign and succeeded him on July 17, 1864. He immediately abandoned Johnston's cautious tactics and took the aggressive, but was defeated on every occasion. In order to draw Sherman from his contemplated march to the sea, Hood led his forces northward into Tennessee, where, in the battles of Franklin and Nashville, his army was completely overwhelmed and almost destroyed.

**Hood**, MOUNT, a mountain in the Cascade range, in the State of Oregon. It is about 12,000 feet high. It is easily ascended and affords a beautiful view of the surrounding country.

**Hood**, THOMAS (1799-1845), an English poet and humorist. During a residence at Dundee, while only fifteen or sixteen years of age, he contributed articles to a local paper and magazine. In 1821 he became sub-editor of the *London Magazine*, and while in this position he made the acquaintance of Lamb, De Quincey and Hazlitt, who were also on the staff of that magazine. In 1826 appeared his *Whims and Oddities*, which was followed by *National Tales* and a volume of serious poetry. In 1829 he began his *Comic Annual*, and in the same year he contributed to another annual *Eugene Aram's Dream*, one of his best-known poems. In 1838, on the ter-

## Hooker

mination of the *Comic Annual*, he commenced a monthly periodical entitled *Hood's Own*, which consisted chiefly of selections from the former work. In 1839 he published his *Up the Rhine*, which, based on Smollett's *Humphry Clinker*, was very popular. It was during his last illness that he wrote *The Song of a Shirt*, *The Bridge of Sighs* and *The Lay of the Laborer*. Hood is unrivaled as a punster, and he possesses a singular power of combining the humorous with the pathetic.

**Hooker, JOSEPH** (1814-1879), an American soldier, born at Hadley, Mass. He graduated at West Point in 1837, served on the southern and northern frontiers and in the Mexican war, being brevetted captain, major and lieutenant colonel, successively, for gallantry. He resigned from the army in 1858, engaging in private business, but in May, 1861, he was appointed brigadier general of volunteers. In the following spring he was promoted to be major general of volunteers and as a result of excellent service in the Peninsula Campaign and at South Mountain and Antietam, he was appointed brigadier general in the regular army. After commanding a division at the Battle of Fredericksburg, he was appointed to the command of the Army of the



JOSEPH HOOKER

Potomac in January, 1863, and displayed remarkable ability in organization and discipline, but failed to show great military talent in command of large forces. On May 2 to 4, 1863, he suffered a terrible defeat at Chancellorsville (See CHANCELLORSVILLE, BATTLE OF). He followed

## Hookworm

Lee upon his second invasion of the North, but just at the crucial point in the campaign he was superseded at his own request by General Meade. He then joined Rosecrans before Chattanooga, and on November 24 he distinguished himself as a leader in the famous "Battle above the Clouds." For this service he was brevetted major general in the regular army, and with Sherman he performed notable service in the Atlanta campaign.

**Hooker, MOUNT**, one of the highest peaks in the Rocky Mountains in Canada, situated near the boundary between British Columbia and Alberta. Its altitude is estimated at 15,700 feet.

**Hooker, THOMAS** (1586-1647), an American colonist and clergyman, one of the founders and the chief promoter of the Connecticut colony. Driven by persecution to Holland, he preached there as he had in England, but in 1633 went to New England and settled in Cambridge. Three years later, owing to the pressure of population and to other causes, he moved with his congregation westward to the Connecticut valley, where he established a settlement at Hartford. Other settlements sprang up in the vicinity, but Hooker's influence was paramount in them all.

**Hookworm**, a worm which lives as a parasite in the intestines of human beings, and is the cause of the so-called hookworm disease, or hookworm anemia. The parasite is threadlike in form, from one-fifth to one-half an inch in length; and bears in its mouth six incurving hooks, or teeth, with which it fastens itself to the lining of the intestines. When the number of these parasites is large, dyspepsia and profound anemia, with emaciation and even death, may result. A marked symptom of the disease in all its forms is a lack of ambition, a lessening of intellectual capacity, and a lowered power of resistance to other diseases.

The intensive study of the hookworm was begun in 1902. There was much amusement, at first, over the search for the "lazy worm," but the discovery of its habits and the methods of prevention and cure is considered one of the triumphs of modern science. The larvae of the parasite enter the body either through the mouth, with infected food or drink, or more frequently through the skin, especially the skin of the feet. The disease is most common in the southern part of the United States, where in the country districts sanitary conditions are often far from ideal, and where warm weather allows many people to go barefoot. Experts declare that the hookworm is largely if not entirely responsible



## Hoopoe

for the backwardness and lack of ambition among the "poor whites" of the South, and predict a remarkable improvement if the scourge can be done away with. The negroes have the disease, also, and some investigators believe that the worm was brought from Africa by the slaves, but the results are less serious with the black race than with the white. Preventive measures include better sanitary arrangements, greater personal cleanliness, and the wearing of shoes; the cure, very satisfactory in most cases, consists of a vermifuge, most commonly thymol.

In 1909 a gift of \$1,000,000 from John D. Rockefeller made possible the establishment of the Hookworm Commission, which has made valuable discoveries and suggested methods of control. Care in the admission of immigrants has been recommended, as it is known that a large proportion of the natives of India, China, Egypt, Porto Rico and other warm countries are infected with the disease.

**Hoop'oe**, a European bird, related to the kingfishers and hornbill. It is about twelve inches long and has a fine crest of pale, cinnamon-red feathers, tipped with black. The upper surface of the bird is, on the whole, ashy brown; its wings are black with white bars, and its throat and breast are pale fawn, shading to



HOOPOE

white, marked with black streaks and dashes on the abdomen. The hoopoe feeds on the ground, preying chiefly on insects, and is not particular about the cleanliness of its food. Large objects are rapped on the ground and usually tossed into the air before being swal-

## Hop

lowed. The birds fly well and run rapidly, and by the Mohammedans they are venerated as being the favorite birds of Allah.

**Hoorne** or **Horn**, **PHILIPPE DE MONTMORENCY-NEVELE**, Count of (about 1518-1568), a Flemish statesman and soldier. He held important posts under both Charles V and Philip II. As counselor of state he opposed Granvella and attempted to secure toleration for the Protestants. When Alva arrived in the Netherlands, Hoorne, although he had always remained true to the Spanish crown, was accused of treason, was given a trial before the Council of Blood and with Egmont was put to death.

**Hoo'sac Tunnel**, a tunnel through Hoosac Mountain, in the northwestern part of Massachusetts, 137 miles west of Boston. It is four and three-quarter miles long. The cross section is twenty-four feet wide in the widest part and twenty-two feet eight inches high, and the tunnel carries two railway tracks. It is used by the Fitchburg division of the Boston & Albany railroad. Work on this tunnel was first begun in 1856, but was soon abandoned. It was resumed in 1862 under control of the state, and the tunnel was completed in 1873, at a cost of about \$11,000,000. Work was carried on at the same time from each end and from a shaft 1028 feet deep, which was sunk near the middle. This shaft is now used for ventilating. This is the longest tunnel in America.

**Hoo'sick Falls**, N. Y., a village in Rensselaer co., 27 mi. n. e. of Troy, on the Hoosac River and on the Boston & Maine railroad. It has good water power and the manufactures include agricultural implements, flour, cottons and woollens, shirts, paper and paper-making machinery. The place was settled in 1688 and was incorporated in 1827. Population in 1910, 5532.

**Hop**, a plant of the hemp family, a native of Europe, that also grows wild in the United States. The rough, twining stems grow from a perennial root and bear large-lobed leaves. The plant is cultivated for the sake of the catkin-like fruits, which are used to give to beer its bitter aromatic flavor. Hops are planted in hills. Here great poles are stuck into the ground early in the season, and three or four plants are trained to climb each. At the proper season the poles are taken down, the catkins are gathered into huge baskets and carried to a building, where they are dried and pressed into solid bales. In this condition they may be kept for years, if they are not

## Hope

allowed to grow moist. The cultivation of the hop is more carefully attended to in England, especially in the County of Kent, than in any other country; but hop growing is an important industry in the United States, Austria-Hungary and Germany, also. In 1910 the United States produced over 40,000,000 pounds, the greater part of the product coming from New York, Oregon, California and Washington, in the order named

**Hope, ANTHONY.** See HAWKINS, ANTHONY HOPE.

**Hopi, ho'pe.** See MOKI.

**Hopkins, JOHNS.** See JOHN S HOPKINS UNIVERSITY.

**Hopkins, MARK** (1802-1887), an American educator, born at Stockbridge, Mass. He became professor of moral philosophy in Williams College, and later, president of that institution, which position he held for thirty-six years. During his administration the influence of the college was greatly extended, and it became widely known throughout the country as an institution of the first rank. Doctor Hopkins had a strong personality, which he impressed upon all students, and because of his influence in the development of character, as well as his power as a teacher, he ranked among the great educators of his time. Some of his best-known works are *The Influence of the Gospel in Liberating the Mind, Moral Science, The Law of Love and Love as Law* and *The Spiritual Idea of Man*.

**Hopkins, STEPHEN** (1707-1785), an American statesman, signer of the Declaration of Independence. He was born in Rhode Island, became a member of the general assembly in 1732 and served his state from that time almost continuously until his death. In 1751 he became chief justice of the superior court, four years later was elected to the governorship, and held that office nine times in the next thirteen years. He was a delegate to the Albany Convention in 1754 and from 1774 to 1780 was a delegate to the Continental Congress. During the Revolutionary period he published many pamphlets in behalf of the colonial cause.

**Hopkinsville, Ky.,** the county-seat of Christian co., 75 mi. n. w. of Nashville, Tenn., on the Louisville & Nashville, the Illinois Central and other railroads. It is the seat of Bethel Female College and South Kentucky College, and the Western Kentucky Asylum for the Insane is located here. The city is now growing rapidly and is principally engaged in the

## Horace

handling and manufacture of tobacco, though it has a considerable trade in grain and live stock. The place was settled in 1797. Population in 1910, 9419.

**Hoquiam, ho'kwe am, WASH.,** a city of Chelalis co., is situated on Grays Harbor and on the Northern Pacific Railroad, 18 mi. w. of Montesano and about 8 mi. w. of Aberdeen. The city is in a valuable timber region and is an important commercial and manufacturing center. It has extensive lumber mills, a shipyard and other industries. It is an important shipping point for fish, furs and lumber. Population in 1910, 8171.

**Horace, hor'ase** (65-8 B. C.), the common name of Quintus Horatius Flaccus, the greatest of Latin lyric poets, born at Venusia, in southern Italy. When Horace was about twelve years of age his father removed with him to Rome, where he received an excellent education, and six years later he went to Athens to complete his studies. After the assassination of Caesar, Brutus came to Athens, and Horace, along with other Roman youths, joined his army. He was appointed to a military tribuneship, was present at Philippi, and on the defeat of Brutus saved himself by flight. On the proclamation of an amnesty to the vanquished, Horace returned to Italy; but found his father dead, his paternal estate confiscated and himself reduced to poverty. He was, however, enabled to purchase a clerkship in the quaester's office, which permitted him to live frugally and to cultivate his poetical talent. His poems procured him the friendship of Vergil and Varius, and to them he was indebted for his first acquaintance with Maecenas, who was the friend and confidant of Augustus Caesar and who expended his wealth for the encouragement of literature and the arts. Maecenas received Horace among his intimate friends and, after some years, presented him with a small estate in the Sabine hills, which was sufficient to maintain him in ease and comfort during the rest of his life. He had also a cottage at Tibur, and at Rome or at one of these country residences the latter part of his life was spent. Although he was ultimately introduced to Augustus, he never sought favors from him, and he is said to have declined an offer of the management of the private correspondence of Augustus. His works consist of four books of *Odes*; a book of *Epodes*, or short poems; two books of *Satires*, and two books of *Epistles*, one of which is often cited as a separate work.



## Horehound

under the title of the *Art of Poetry*. The lyrics of Horace are largely based on Greek models, but the exquisite beauty of his language is all his own. It is, however, in his satires and epistles that he shows the greatest power and originality, wit, gravity and gaiety, tender sentiment and melancholy. His writings have been often translated, and into many languages. In English, Pope and Swift have given free imitations of various parts of his writings.

**Hore'hound**, a plant of the mint family, with whitish, downy leaves and stem. The flowers are small and nearly white, possessing an aromatic smell and bitter flavor. The leaves also are fragrant and in various forms are used as a popular remedy for coughs and colds. Horehound is a native of Great Britain and Continental Europe, and black horehound is domesticated in the United States.

**Horn**, the name given to a large class of musical instruments, originally formed, as the name denotes, from the horn of an animal. The French horn, or simply *the horn*, consists of a metallic tube, about ten feet in length, very narrow at top, bent into rings and gradually widening toward the end whence the sound issues, called the *bell*. It is blown through a cup-shaped mouthpiece, of brass or silver, and the sounds are regulated by the player's lips, the pressure of his breath and by the insertion of the hand in the bell of the instrument. The French horn has been superseded by the valved horn, which has a greater variety in pitch and quality. Its compass is about three octaves. Music for the horn is always written in the key of C and an octave higher than it is played, but it can be played in almost any key, by adjusting the length of the tube.

**Horn**, a general term applied to all hard and pointed appendages of the head, such as those in deer, cattle, sheep and goats. As a term denoting a particular kind of substance, nothing should be called horn which is not derived from the epidermis, or outer layer of the skin, whether on the trunk, hoofs or head. Horn is a tough, flexible, partially transparent substance, most liberally developed in the horns of animals of the ox family, but also found in connection with the "shell" of the tortoise, the nails, claws, and hoofs of animals and the beaks of birds and turtles. Horn is softened very completely by heat, so as to become readily flexible and to adhere to other pieces similarly softened. In some species of animals the males only have horns, as, for instance, the stag. In cattle, both

## Hornbill

male and female have horns. Horns differ widely in the case of different animals. Thus, the horns of deer consist of bone and fall off at regular intervals; those of the giraffe are independent bones, with a covering of hairy skin; those of oxen, sheep and antelopes consist of a bony core covered by a horny sheath. The horns of the rhinoceros alone consist exclusively of horny matter. The horns of oxen, sheep, goats and antelopes are never shed, except in the case of the prong-horned antelope. The number never normally exceeds four, and in the case of deer the horns are branched.

The various kinds of horns are employed for many purposes. The principal ones used in the arts are those of the ox, buffalo, sheep and goat. Deer horns are almost exclusively employed for the handles of knives and of sticks and umbrellas. Those which furnish true horn can be softened by heat (usually in boiling water), and cut into sheets of various thickness. These sheets may be soldered or welded together at the edges, so as to form plates of large dimensions. These can be polished and dyed so as to imitate the much more expensive tortoise shell. The clippings of horn may be welded together in the same manner and made into snuff-boxes, powder-horns, handles of umbrellas, knives, forks and other small articles. As horn has the valuable property of taking on and retaining a sharp impression from a die, many highly ornamental articles may be turned out. Combs for the hair are made from the flattened sheets, and out of the solid parts of buffalo horns beautiful carvings are made.

**Horn**, PHILIPPE DE MONTMORENCY-NEVELE, Count of. See HOORNE, PHILIPPE DE MONTMORENCY-NEVELE, Count of.

**Horn'beam**, a small, bushy tree, common in Great Britain, often used in hedges, as it survives cutting and in age becomes very stiff. The wood is white, tough and hard and is used by carpenters and wheelwrights in making various articles, but it does not withstand the action of water or the weather well and should not be used in exterior construction. The inner bark yields a yellow dye. The American hornbeam is a small tree sparingly diffused over the whole United States, where it is called *leverwood*, *ironwood* and *blue beach*.

**Horn'bill**, a bird related to the kingfishers and toucans, living in the warm parts of Africa, southern Asia and the islands of the Pacific Ocean. Its enormous bill is its most striking characteristic. This formidable weapon is long,

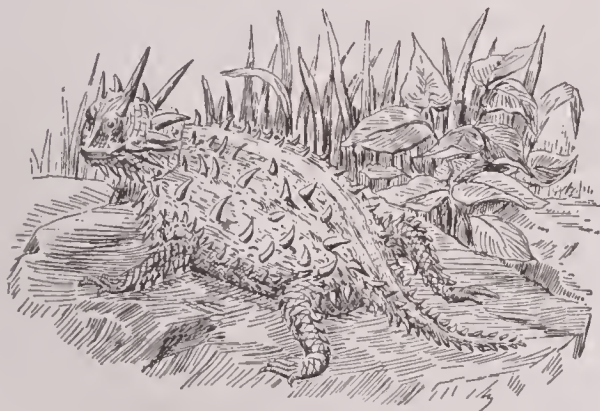
## Hornblende

broad, curved and in some species has a large helmet-shaped or horn-like projection nearly as large as the bill itself. The bill of the rhinoceros hornbill is about a foot long, but in spite of its great size it is very light. The bird is stupid and clumsy, has a heavy, slow flight and feeds upon soft foods and fish and reptiles. It nests in hollow trees, and when the eggs are all laid, the female goes in upon the nest, the male closes with mud all but a narrow opening and carefully feeds the female, who sits in imprisonment upon the eggs until they are hatched.

**Hornblende**, *horn'blend*, or **Amphibole**, *am'fe bole*, one of the most abundant and widely diffused of minerals, remarkable on account of the various forms and compositions of its crystals and crystalline particles and because of its exceedingly diversified colors. These variations give rise to almost numberless varieties, many of which have obtained distinct names. Hornblende frequently occurs in distinct needle-shaped crystals, which are grouped in various ways. It enters largely into the composition and forms a constituent part of several of the trap rocks, and it is an important constituent of several species of metamorphic rocks, as gneiss and granite. In color, hornblende exhibits various shades of green, often inclining to brown, white and black, with every intermediate shade; it is nearly transparent in some varieties, in others it is opaque; its hardness is about the same as that of feldspar. Its chief constituents are silica, magnesia and alumina.

**Horned Owl.** See OWL.

**Horned Toad**, a name given to a genus of lizards, of toad-like appearance, found in



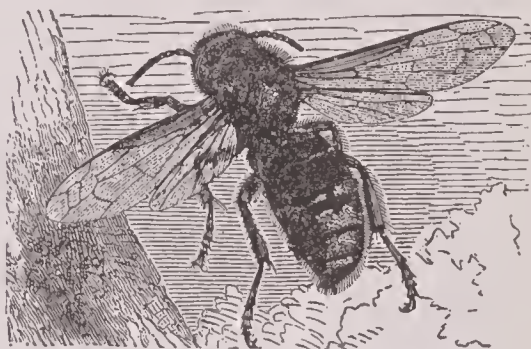
HORNED TOAD

America west of the Mississippi, where it lives in dry places and feeds upon flies and various insects. The scales covering the body bear sharp, horny spines; hence the name. There are nine different species

## Horse

**Hornell**, NEW YORK, a city in Steuben co., 91 mi. s. e. of Buffalo, on the Canisteo River and on the Erie and other railroads. It was settled in 1790 and was known as Upper Canisteo until 1820. A city charter was received in 1890. The place has a good high school, a free library, several city parks, Saint Ann's Academy, Saint James Mercy Hospital and a number of fine public and private buildings. The city is in a fertile agricultural and fruit region and has manufactories of lumber products, railroad supplies, agricultural implements, furniture, silks and various other articles. Population in 1910, 13,617.

**Hor'net**, an insect much larger and stronger than the ordinary wasp. It is voracious, feeding on fruit and honey and on other insects.



HORNET, ENLARGED

Hornets live in colonies and make their nests of a kind of paper work, placing them in hollow trees, in the crevices of walls and upon the limbs of trees. All species are able with their stings to inflict painful wounds, which are usually accompanied with considerable swelling.

**Hor'oscope**, a scheme, or figure, of the twelve houses, or twelve signs of the zodiac, in which is marked the disposition of the heavens at a given time and place. By this diagram, astrologers formerly told the fortunes of persons, according to the position of the stars at the time of their birth. The ascendant was that part of the heavens which was rising in the east at the moment; this was the first and most important house, or house of life, and contained the five degrees above the horizon and the twenty-five beneath it. See ASTROLOGY.

**Horse**, a domestic animal, closely related to the ass and the zebra. The horse is not a cud-chewing animal. It has a single, unparted hoof and a compact, graceful body, with arched neck and long mane. The horse is a native of the East and was introduced into America by Columbus and those who immediately followed. The herds of wild horses found by later colonists



## Horse-chestnut

sprang from those introduced by the early settlers.

Our modern horses can be classified under three groups, the small breeds, generally known as ponies; the heavy draft horses, and the more graceful thoroughbreds, used for carriage horses and racing. The ponies have descended from the wild horse of the mountainous regions of northern India. The heavy draft horses have been developed by careful breeding with the larger types of central and northern Europe, and the thoroughbreds are from the Arabian and Turkish horses.

In England and the United States, horse racing has been an enticing sport for many years, and much attention has been given to the development of racing animals, until now horses that can trot a mile inside of two minutes are found on race courses.

The horse is one of the most intelligent of animals and is gifted with keen senses. He can distinguish objects at night, and his large ears, movable in different directions, enable him to perceive sounds that man cannot hear. His sense of smell sometimes also warns him of the approach of dangerous animals and enables him to distinguish his master from other men. The horse takes more kindly to man than other animals and becomes more devotedly his friend. The Arab loves his horse next to his family, and the animal returns his affection. Horses often show love for children and form friendships with dogs and other domestic animals. They can usually be ruled by kindness, and no animal deserves better treatment or returns it with more certain gratitude.

**Horse-chestnut**, *ches'nut*, a handsome genus of trees or shrubs, with large, opposite, fan-shaped leaves and terminal panicles of showy white, yellow or red flowers. The seeds are large and brown and are highly polished, and the bitter meats have been used as food for animals. The wood is not valuable. Some

## Horseshoe

species are found in North America, but they are smaller than the true horse-chestnut and are less valuable for their wood. See BUCK-EYE.

**Horse Latitudes**, the sailor's name for the belts of tropical calm found near the tropic of Cancer and the tropic of Capricorn. These are not continuous belts of calm, but within these latitudes regions of calm appear, separated by spaces where there is a regular and constant breeze. They are but a few degrees wide and move slightly north and south with the movement of the sun. Within these regions the weather is clear, and fresh, light, variable winds follow the occasional calms. The horse latitudes are not dangerous, as are the doldrums, but are a hindrance to sailing vessels. These calms are so named because before the days of steamships many horses were exported from the United States in vessels whose route lay through the regions of tropical calms in the North Atlantic. If becalmed for any length of time some of the horses were thrown overboard, since the ship could not carry a sufficient supply of fodder for the prolonged voyage. See DOLDRUMS.

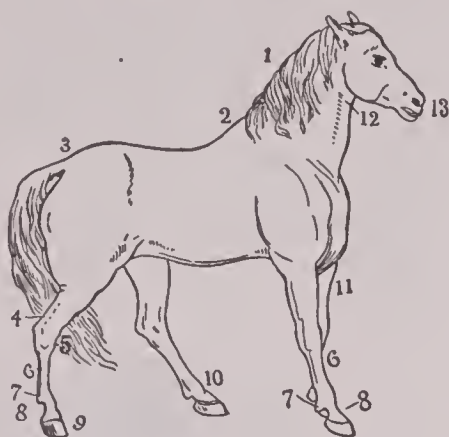
**Horse'manship**. See RIDING.

**Horse Power**, the unit of force employed in measuring the power of steam engines and other motors. A horse power is a force which will raise a weight of 33,000 pounds one foot in one minute. An engine of one hundred horse power could lift the same weight one hundred feet in one minute. This estimate is theoretical. In a practical estimate one-tenth is deducted for friction.

**Horse Racing**. See RACE.

**Horse-radish**, a plant belonging to the mustard family and inhabiting moist places in the temperate parts of America. The root is cylindrical, whitish in color, possesses a pungent taste and odor and when grated is used with vinegar as a relish to meats and other foods. It is also employed medicinally as a stimulant.

**Horseshoe**, a shoe for horses, consisting commonly of a narrow plate of iron, bent into a form somewhat resembling the letter U, so as to accommodate itself to the shape of the horse's foot. Horseshoes do not appear to have been known to the ancients. Xenophon, Vegetius and others mention various processes for hardening the hoofs so as to make them stronger, but say nothing of any protection like the horseshoe. Iron horseshoes are mentioned as being in use in Europe in the ninth century of our era.



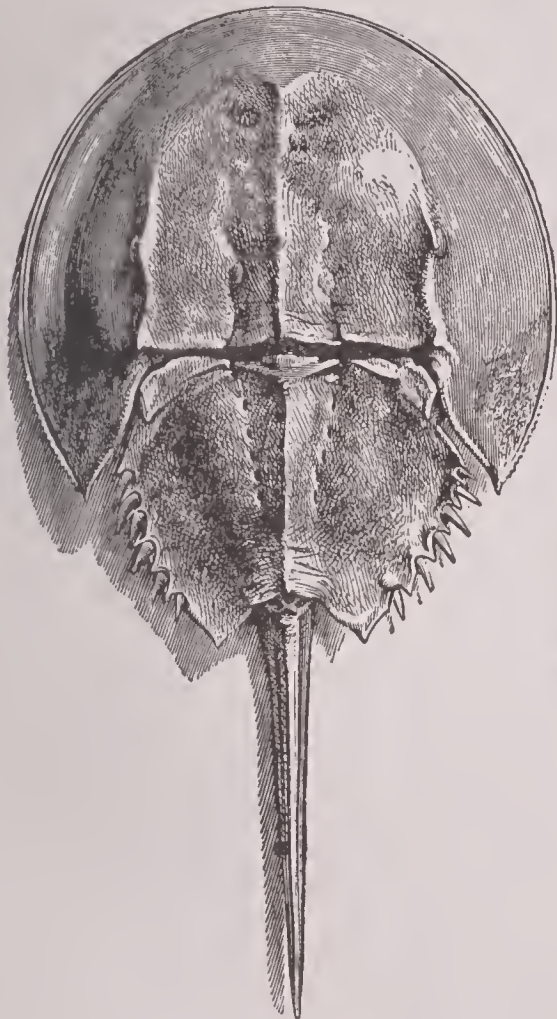
HORSE

1, Crest; 2, withers; 3, croup; 4, hamstring; 5, hock; 6, cannon; 7, fetlock; 8, pastern; 9, hoof; 10, coronet; 11, arm; 12, gullet; 13, muzzle.

## Horseshoe Crab

They seem to have been introduced into England by the Normans. They were introduced into the United States by the early colonists and are now in use by all civilized nations.

**Horseshoe Crab**, a large crustacean which receives its name from the shape of its shell. It lives in deep waters and comes to the surface only during the spawning season, when it



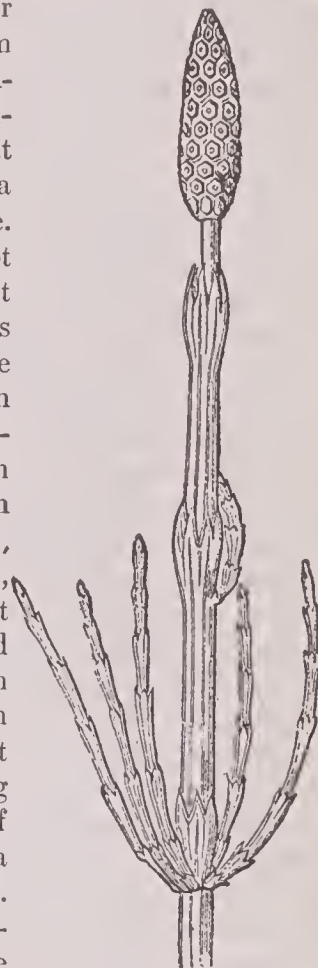
HORSESHOE CRAB

appears in great numbers. The *king crab*, found on the northeastern coast of the United States, where it reaches a length of nearly two feet, is also called horseshoe crab. It burrows in the sand and mud and lives on shellfish and worms. In burrowing, the head is thrust downward and the tail is used as a brace to push the body forward. The body of the horseshoe crab is composed of two parts, the horseshoe shell and a back region, which is prolonged into a long, spine-like tail.

**Horsetail Rush** or **Eq'wise'tum**, a peculiar plant, of which now there is only one genus remaining, though in the early history of the earth there were many kinds, some of which were enormous trees. The present plant is small and

## Horticulture

slender, with roughly-ridged stem, and it may be recognized by the ease with which it is pulled apart at the joints, which are surrounded by circles of minute leaves. The stem is green in all species, except that the fertile plants of some are colorless. In one or two species the stem is straight and unbranched, while in others it branches so that the plant resembles a little evergreen tree. These rushes are not flowering plants, but the fertile form produces spores not unlike those of the fern, but held in cases that resemble miniature pine cones. Each spore is provided with two spiral bands which, while the spore is moist, are coiled tightly about its body, but when dried unroll to be again drawn up to the body when moisture is applied. It is an interesting thing to watch the action of these bands under a simple magnifying glass. The result of the opening and closing of the bands is to bring the spores tightly together in masses. The horsetail rush is commonly known as the *scouring rush*.



HORSETAIL RUSH

**Hors'ley**, VICTOR ALEXANDER HADEN, Sir (1857- ), an English surgeon, noted especially for his studies of nervous diseases and his discoveries of the functions of specific areas of the brain. Among his important works are a *Pathology of Epilepsy and Canine Chorea*, *Brain Surgery*, *Hydrophobia and its Treatment* and *Experiments upon the Functions of the Cerebral Cortex*.

**Hor'ticul'ture**, the cultivation of fruits, vegetables and ornamental plants; a branch of agriculture. Horticulture is practiced for pleasure and for commercial purposes. Formerly the term meant the same as gardening, but in the United States it has outgrown that meaning. Horticulture was developed much later than agriculture and is usually most prosperous in the older countries. When practiced for commercial purposes, it leads to a number of different



industries. The raising of vegetables is generally known as truck farming. This line of horticulture is extensively carried on near large cities and in the South Atlantic states. It has become an important industry and now employs nearly two hundred fifty thousand persons and has an annual return of about eighty million dollars. The growing of flowers and ornamental shrubs for sale is another important branch of horticulture. Nurseries and conservatories, whenever practicable, are located near cities, as it is necessary that products be placed on the market without delay. The practice of horticulture requires a thorough knowledge of the properties of soils and of the habits of the plants grown and the conditions under which they thrive. It is estimated that there are over twenty-five thousand species and varieties of plants that engage the attention of horticulturists in the United States. See AGRICULTURE; GARDENING; LANDSCAPE GARDENING.

**Hosea**, *ho ze'ah*, the first in order among the minor prophets of the Old Testament, but probably the third in order of time. Nothing is known of his life, except that he was the son of Beerī and that his ministry belonged to the reigns of Uzziah, Jotham, Ahaz and Hezekiah, kings of Judah.

**Hos'mer**, HARRIET (1830-1908), an American sculptor, born at Watertown, Mass. She studied at Rome under John Gibson, and her best-known works are ideal heads of *Daphne* and *Medusa*, *Puck*, the *Sleeping Faun*, *Waking Faun*, *Beatrice Cenci* and *Zenobia in Chains*.

**Hos'pital**, any building appropriated to the use of any class of persons who are unable to supply their own wants. Hence, hospitals are of various kinds, according to the class of persons for whom they are intended. A large number of hospitals are medical; others are for the reception of the insane; others for the aged and infirm; others for the education of dependent children; others for the reception of the wounded in battle, and so on. The first establishments of this nature are believed to belong to the fourth century after Christ. Their primary object was to afford a shelter to strangers and travelers, and it was only occasionally that the sick and infirm were admitted. One of the earliest hospitals of which we have any satisfactory information was that established by the emperor Valens, at Caesarea, about the end of the fourth century, and conducted on a very large scale. During the crusades several military orders, like the Knights Hospitallers,

were created to care for the wounded and sick. The Arabs in Spain, at an early period of their occupation of that country, founded a magnificent hospital at Cordova, where physicians were trained, who did a great deal to advance the study of medicine. The Arabs have also the credit of having founded the first lunatic asylum in Europe, which was erected in the city of Granada.

The majority of hospitals everywhere are medical. These may be divided into general and special hospitals, the former class admitting cases of all kinds; the latter class admitting only patients suffering from some special trouble. Thus, there are hospitals for the treatment of cancer, consumption, smallpox and many other diseases. There are also hospitals for children and those for persons suffering from incurable diseases. Such institutions serve a double purpose, inasmuch as they not only afford the best medical advice and treatment to the poor, who would otherwise be unable to obtain them, but also supply the best means of giving instruction in medicine, surgery and nursing to students, who may thus watch nearly every variety of disease and observe how all are treated by the most skilled physicians and surgeons. For this reason a good infirmary, or medical hospital, is an indispensable adjunct to every school of medicine and surgery.

Hospitals for the sick and hurt are usually divided into wards, each containing a large or small number of beds. Medical and surgical wards are usually kept separate, and all contagious diseases are treated by themselves in distinct buildings. Each hospital has a matron, a house surgeon and an apothecary resident within its walls. The duties of the matron consist in regulating the night and day nurses, the washing and laundry department, the purchase of the necessary supplies of provisions, and in keeping a general superintendence over the kitchen and the food of the sick. The house surgeon takes care of all casualties and accidents in the absence of the principal surgeons. The apothecary takes care of the pharmacy and prepares all the medicines prescribed from time to time by the surgeons and physicians. There is a well-lighted, well-equipped room set apart for the performance of surgical operations, and there is a mortuary for the reception of corpses previous to interment. The nurses relieve one another day and night in a regular manner.

Objection has been made to the present plan of constructing large edifices for hospital purposes,

## Hospital

because the benefit they confer is greatly diminished by the risk of contagion to which patients are exposed; and the cottage system of construction has been strongly advocated. This form of hospital consists of temporary, detached cottages which can be easily removed or replaced. Difficulties in connection with expense and administration of this system have made it impracticable. The pavilion system of construction is a compromise between the large blocks and the cottages, or huts. According to this system, the wards should be separated from the administrative part of the establishment and should be arranged in pavilions of one story, where practicable, but never of more than two. The pavilions should always surround the administrative blocks. This mode of construction is equally applicable to large and small establishments. The Royal Infirmary of Edinburgh, the Herbert Hospital of Woolwich and the New York Hospital are among the best examples of the pavilion style. Convalescent homes, where patients are reinvigorated by a short stay, after being cured in the infirmary, may be regarded as supplementary to medical hospitals. Hospitals under the control of the city are located in all large places, and others are established by counties and by states, and in recent years many of the smaller cities and towns are erecting hospitals, which are attended by local physicians. In these the patients are often cared for by Sisters of Mercy or members of some similar charitable organization. Hospitals or asylums for drunkards, for habitual users of opium or morphine and for other vicious classes have been established in many parts of the United States.

*Military and naval hospitals*, or establishments for the reception and care of sick and wounded soldiers and seamen, have been in existence in all civilized countries for a long period. Military hospitals are either permanent or temporary establishments. Temporary hospitals are any available buildings in the immediate vicinity of the scene of operations. Hospital ships are fitted out to accompany all expeditions on sea. They serve either as stationary hospitals or, if the sick accumulate, they can sail home or to a near-by port. Such a ship is regarded by civilized nations as not subject to attack, provided it carries no arms and makes no attempt to give aid except to sick and wounded. The United States hospital ships are painted white, with a broad green band the length of each side. They fly the red cross flag, as well as the national ensign.

## Hotel

**Hos'tage**, a person or thing given to another as surety of the performance of a certain contract. It is common in time of war for a town that has surrendered to give the victors the custody of several officers, as pledge that the conditions of surrender will be lived up to. Sometimes, also, the victors place hostages in the hands of the vanquished, to guarantee the fulfillment of their promises. When the conditions have been fulfilled, the hostages are exchanged.

**Hotch'kiss**, BENJAMIN BERKELY (1826-1885), an American inventor, born in Watertown, Conn. He designed a field gun on a new pattern, and in 1860 he submitted to the United States government a system of rifle projectiles, which was largely used during the Civil War. In 1867 he introduced his revolving cannon to the European governments, and after that he devised a magazine rifle.

**Hotel'**, a house open for the accommodation of the public, with board and lodging. It is a comparatively modern development of the old inn, or road house, which is still common in Europe, where provision was made for occasional guests. Hotels are of three kinds—those managed upon the so-called *European* basis, according to which a set price is paid for a room and its accompanying accommodations, while the guest pays separately for the food which he orders; those on the *American* plan, according to which the guest pays a certain amount each day for both room and meals, and those which combine in their management these two plans.

A modern hotel contains a large number and variety of rooms and appointments. Of course, by far the largest space is given to the private bedrooms occupied by guests. One of the most conspicuous features is the so-called office, or lobby, which, besides containing the office of the hotel, is usually the meeting place for persons both within and without the building, and which contains numerous news, cigar and confectionery stands, telephone booths and telegraph offices. Adjoining it are usually reading, writing and smoking rooms, while near at hand, either on the same floor or upon the floor above, are the parlor and reception rooms, both public and private. Most hotels have several dining rooms, one large public dining room, a smaller café, or breakfast room, and private dining rooms, according to the size and rank of the hotel. A majority of American hotels now have one or more bars, barber shops and public baths. All floors are connected by elevators



## Hot Springs

and usually by broad decorative stairways. Beneath the office, or in some other convenient place, are baggage and store rooms, while above, besides the guest rooms, there may be a ball room, a concert hall, a theater, a roof garden, or all of these.

The safety of the guests is carefully attended to, both in the construction and sanitation of the building and in the provision of numerous means of escape in case of fire or accident. For the convenience and comfort of the guests many accommodations are provided, such as bells, by which attendants are summoned to the various rooms in the building, and, more recently, private telephone exchanges, with connection, not only with all parts of the building, but with systems outside of the hotel.

The management of a modern hotel requires the services of a large number of persons, usually fully one-half as many as the number of guests for which the hotel has accommodations. The chief executive is the manager, under whom, next in importance, is the steward, who has entire charge of the purchases and supplies. The kitchen is in charge of the *chef*, who arranges and provides the meals, reporting his needs to the steward. In the dining room the chief person is the head waiter.

In the law, hotels are treated in much the same light as common carriers; that is, they are bound to receive all proper persons who apply to them for accommodations; they are liable for the safety of goods left within their premises, unless the damage done is by act of God or the public enemy, and, on the other hand, they have a lien on the goods of guests to assure the payment of their bills. See **CARRIER, COMMON**.

**Hot Springs, ARK.**, the county-seat of Garland co., 50 mi. s. w. of Little Rock, on the Little Rock & Hot Springs and the Chicago, Rock Island & Pacific railroads. The city is in a beautiful location and has a mild climate. On account of the many flowing springs of hot water, it has become one of the greatest health resorts in the world. The water is prescribed for bathing and drinking and has strong curative properties. In 1832 the national government set off 2529 acres of land, with the thermal springs in the center, as a government reservation. There are many large hotels here, among which are the Eastman, the Arlington, the Park and the Majestic. Considerable stone is quarried in the neighboring mountains, and the city has an extensive cotton market. Hot

## Hourglass

Springs was settled about 1804 and was chartered as a city in 1879. A fire on September 5, 1913, destroyed property to the value of \$6,000,000. Population in 1910, 14,434.

**Hot'tentots**, a peculiar African race, supposed by some authorities to be the aboriginal occupants of the south end of that continent, south of the Orange River and west of the Kei. When young they are of remarkable symmetry; but their faces are ugly, and this ugliness increases with age. The complexion is a pale olive, the cheek bones project, the chin is narrow and pointed and the face consequently is triangular. The lips are thick, the nose is flat, the nostrils are wide, the hair is woolly and the beard is scanty. The ears are large, without lobules. When the Dutch first settled at the Cape of Good Hope, in the middle of the seventeenth century, the Hottentots were a numerous nation, of pastoral and partially nomadic habits, and occupied a territory of 100,000 square miles. At the present day this race is nearly extinct, having been entirely hunted out and dispersed.

**Houdon**, *oo doN'*, **JEAN ANTOINE** (1741-1828), a noted French sculptor, born at Versailles. Early in life he showed a genius for sculpture and studied conscientiously the works of the great masters. His study in Rome, which lasted ten years, was very important as being the formative period of his life. After his return to Paris he was admitted to the Academy and was at once recognized as one of the greatest of French sculptors. In 1785 he visited America with Benjamin Franklin, and during his stay he executed a bust of George Washington. Houdon's greatest work was the series of more than two hundred busts of eminent men, the best of which were of Franklin, Gluck, Molière, Rousseau, Mirabeau and d'Alembert. Among his important statues are those of Cicero and Voltaire. Other works especially worthy of mention are his familiar *Ecorché* and the nude figure of *Diana the Huntress*, made for Catharine of Russia.

**Hound**, a name given generally to hunting dogs, but restricted by scientific writers to such as hunt by scent. Among the varieties are the bloodhound, staghound, foxhound, harrier and beagle. Hounds are distinguished not only by their keenness of scent, but by gentleness and intelligence. Of the rough-haired and smooth-haired varieties, the former manifest the greater affection for man.

**Hourglass**, *owr'glas*, an instrument for measuring time, consisting usually of two hollow

## Housatonic

bulbs, placed one above the other, with a narrow neck of communication, through which a certain quantity of dry sand, water or mercury is allowed to run from the upper to the lower bulb, the quantity of sand being adjusted so as to occupy an hour in passing from one bulb to the other. When all the sand has run into the lower bulb, the glass is turned. The hourglass was commonly used in churches during the sixteenth and seventeenth centuries to regulate the length of the sermon. See **CLOCK**.

**Housatonic**, *hoo'sa ton'ik*, a river rising in the Berkshire Hills, Massachusetts. It flows south through Connecticut and empties into Long Island Sound four miles east of Bridgeport. It is 150 miles long. The surrounding region affords very beautiful scenery.

**House'leek** or **Live-forever**, a genus of plants characterized by the fact that the petals equal in number the sepals, or divisions of the calyx, and are inserted at the base of the calyx. The leaves are usually arranged in the form of compact rosettes. The best-known species, the common houseleek, or cyphel, grows wild in the Alps upon rocky soil, but it has been naturalized in most parts of Europe. Upright stems about six inches in height bear branches of red, star-shaped flowers. The leaves, if bruised or cut, afford immediate relief to burns, stings or other inflammation.

**House of Commons.** See **PARLIAMENT**.

**House of Correction.** See **PRISON**.

**House of Lords.** See **PARLIAMENT**.

**House of Representatives.** See **CONGRESS OF THE UNITED STATES**.

**House Snake.** See **MILK SNAKE**.

**Houston**, *hu'ston*, **TEX.**, the "Magnolia City," the county-seat of Harris co., 50 mi. n. w. of Galveston, is situated on Buffalo Bayou at the head of the Ship Channel, which gives it direct communication with the sea, and on the Missouri, Kansas & Texas, the Texas & New Orleans, the Gulf, Colorado & Santa Fe, the International & Great Northern and other railroads. It has 26 public school buildings and is the seat of the William R. Rice Institute for the Advancement of Literature, Science and Art. There are also located here a Carnegie library, a cotton exchange, a city hall and several fine churches. Houston is one of the largest cotton markets in the world, and has, also, an important trade in lumber, fruit, sugar, rice and hardware. The place was settled in 1836 and was named the next year in honor of General Sam Houston. The city has the commission form of government.

## Houston

Population in 1910, 78,800. Counting the suburbs, there is a total of 103,100.

**Houston**, **SAM** (1793-1863), an American soldier and political leader, born near Lexington, Va. After his father's death, his family emigrated to Tennessee, and the lad later went



SAM HOUSTON

to live among the Cherokee Indians, where he was adopted by Chief Oolooteka as his own son. In 1811 he returned to his family and two years later enlisted in the regular army. He served under General Jackson and in 1817 aided in the negotiations with the Cherokees. On his return to Nashville, he studied law and soon opened an office in Lebanon. He served in Congress from 1823 to 1827 and was then elected governor. After three months he resigned the governorship and returned to the Cherokees.

In 1832 he went to Texas and soon became the leader of the American colonists. He was a member of the convention in April, 1833, which attempted to form a state constitution. When the trouble with the Mexicans had led to an armed conflict, Houston was made the commander in chief of the Texan forces. With a small band of undisciplined troops he conducted the military movements which led to the defeat of Santa Anna in the famous Battle of San Jacinto, April 21-22, 1836. This brought about the independence of Texas, and in September Houston was elected president. He served three terms and was the chief agent in bringing about the admission of Texas to the Union in 1845.



## Hovey

He sat in the United States Senate for twelve years and in 1859 was elected governor of Texas. At the outbreak of the Civil War, he retired to Huntsville, where he died two years later.

**Hovey**, *huv'y*, RICHARD (1864–1900), an American poet, born at Normal, Ill., and educated at Dartmouth. He studied for the ministry and was for a time an assistant in a New York Catholic church, but afterwards devoted himself to literary pursuits and was journalist, dramatist, poet, lecturer and actor. He spent several years in Europe and had shown promise of very high attainments, when he suddenly died. His *Launcelot and Guenevere*, a series of dramas, has remarkably musical lines and shows great imaginative power. Some of his shorter poems also display the same characteristics.

**Howard**, JOHN (1726–1790), an English philanthropist. In 1756 he undertook a voyage to Lisbon, to help the survivors of the recent earthquake, but the vessel in which he embarked was captured and he was consigned to a French prison. The hardships he suffered and witnessed directed his attention to the subject of prison reform, and he resolved to devote his time to the investigation of the means of correcting the existing abuses in the management of prisons. With this view he visited most of the English county jails and houses of correction, and in March, 1774, he laid the result of his inquiries before the House of Commons. He also visited many of the Continental prisons, as well as those of Scotland and Ireland. Many evils were remedied through his influence.

**Howard**, OLIVER OTIS (1830–1909), an American soldier, born in Leeds, Maine, educated at Bowdoin College and at West Point. He served in the Seminole War of 1857 and later was instructor at West Point. He enlisted in the Civil War as colonel of a volunteer Maine regiment and was promoted to be brigadier general of volunteers. In the Peninsula Campaign he distinguished himself, receiving a wound at Fair Oaks, which necessitated the amputation of his right arm. He was conspicuous in the battles of Antietam, Fredericksburg, Chancellorsville and Gettysburg. He then was sent to the west, being present at the Battles of Chattanooga, and commanded the right wing of Sherman's army in his marches to Atlanta and to the sea. He was appointed brigadier general in the regular army and brevetted major general in March, 1865. For several years after the war he was at the head of the Freedmen's Bureau and performed notable

## Howe

service in promoting the education of the negroes. He participated in the Indian campaign of 1872 and 1878, was for a time superintendent of West Point Military Academy, and retired from the service in November, 1894. The following year he founded the Lincoln Memorial University at Cumberland Gap, Tenn.

**Howe**, ELIAS (1819–1867), inventor of the sewing machine, was born at Spencer, Mass. He received a common school education and for several years was employed in a cotton-machinery manufacturing establishment at Lowell, Mass. While working in a machine



ELIAS HOWE

shop in Boston he conceived the idea which resulted in the invention of the sewing machine. He perfected the machine in 1845 and patented it the next year. He was not successful in introducing it in America and so went to Europe, but there he received little encouragement. On his return from Europe he found manufacturers profiting by his invention. He prosecuted those who had infringed upon his rights, and in 1854 his claim to priority was legally established. The principal manufacturers agreed to pay him royalties on all the machines used. After that his income was princely, and his long patience had its just reward. Howe enlisted as a common soldier during the Civil War, and on one occasion, when the pay of the regiment was delayed, he advanced the money to pay off the men. He had conferred upon him the cross of the Legion



## Howe

of Honor and was awarded many medals. The extensive use of the sewing machine attests its value. The shoemaking trade has been entirely revolutionized since its invention.

**Howe, JULIA WARD** (1819–1910), an American author and philanthropist, born in New York City. She was given a thorough education and began early to write plays and poems. In 1842 she was married to Samuel Gridley Howe, a prominent philanthropist, and with him spent some time in London, where she made the acquaintance of many of the most noted people of the day, including Dickens, Wordsworth, Landseer and Florence Nightingale. On returning to the United States the Howes settled in



JULIA WARD HOWE

Boston, where they conducted an anti-slavery paper, the *Boston Commonwealth*. Mrs. Howe wrote much, but is chiefly remembered for her *Battle Hymn of the Republic*, written to the tune of *John Brown's Body*. It appeared during the first year of the Civil War, and became immediately popular. In her later years she was interested in woman suffrage, and a few months before her death she spoke in public on that theme.

**Howe, WILLIAM, Sir** (1729–1814), a British soldier, brother of Richard, Earl Howe. He served in America during the last French and Indian War, but returned to England and was elected to Parliament. At the opening of the American Revolution he condemned the British government's policy, but accepted a command in the British army in America, fought at Bunker Hill, was made lieutenant general and succeeded Gage as commander in chief. After two suc-

## Howells

cessful campaigns, which, however, did not accomplish what he had expected, he resigned in 1788 and was succeeded by Clinton. His inactivity at Philadelphia in the preceding winter led to an investigation, but he was not censured.

**Howells, WILLIAM DEAN** (1837– ), an American author, born in Martin's Ferry, Ohio, of Welsh-Quaker ancestry. He learned the printer's trade with his father and then went to Columbus, where, after serving for some time as a compositor, he became assistant editor of the *Ohio State Journal*. In 1861 he was appointed United States consul to Venice, and as a result of his four years' travels in Italy, he published *Venetian Life* and *Italian Journeys*. On returning to America he wrote for the *Nation* and the *Tribune*, and in 1871 he became editor of the *Atlantic Monthly*. After a residence of several years in England and Italy, he edited for a short time the *Cosmopolitan* and afterward became associated with the editorial department of *Harper's Magazine*. In this editorial work he constantly championed the realistic novel and opposed the romantic school. Although he has written many farces, among them *The Elevator*, *The Sleeping Car*, *The Mouse Trap* and *The Register*, many essays on literary topics and some poetry. His more important novels include *A Modern Instance*, *The Rise of Silas Lapham*,



WILLIAM DEAN HOWELLS

*A Foregone Conclusion*, *A Hazard of New Fortunes*, *The World of Chance*, *Story of a Play*, *Ragged Lady*, *The Kentons* and *Letters Home*. Howells's characters and situations are such as



## Howitzer

may be encountered at any time in real life, and his style is admirably clear and easy.

**How'itzer**, the name of the most destructive gun used in modern warfare. The howitzer is shorter than the usual naval and field guns, and is built for the purpose of dropping heavy missiles on the enemy at an angle not obtained by any other gun. The largest howitzer now known is the German weapon with a caliber, or bore, of 17 inches, firing a huge shell of more than a ton in weight. The howitzer is usually elevated to fire at an angle of 45 degrees. The shell goes up into the air and drops with tremendous force on the trench or fort at which it is aimed. The howitzer is one of the oldest forms of cannon, and was used in Europe before the end of the fifteenth century. Previous to the War of the Nations the howitzer was almost supplanted by smaller guns, but after the destruction of the forts at Liége, Namur, Antwerp and other cities by the new Krupp howitzers, this gun had proved its right to a place among the foremost weapons of destruction.

**Hubbard, ELBERT** (1850-1915), an American writer and maker of fine books, born at Bloomington, Ill. He founded the famous Roycroft Shop in East Aurora, N. Y., which is devoted to the making of *de luxe* editions of classics. He established *The Philistine*, a magazine of philosophy and criticism, notable for its epigrammatic style, its independence of conventionalities and its frank tone, marred at times by vulgarity. He also wrote many essays, including *A Message to Garcia* and the *Little Journeys*, a series of brief studies of the great figures in the world of art, religion, literature oratory and statecraft. Hubbard lost his life when the *Lusitania* was sunk by a German submarine.

**Huckleberry** or **Whortleberry**, the fruit of a common shrub which grows wild in the United States. The common whortleberry is a hardy plant which lives in forests, heaths and on mountains. In some of the pine forests of Scotland it grows to a height of three feet. The berries are gathered in large quantities and sold in the markets during the season. There are many varieties, the blueberry being considered the best. Huckleberries have a pleasant, sweet taste and are used for sauce, jellies and pies and are eaten raw. The small red berries, edible only after being cooked, are popularly known as cowberries.

**Huddersfield**, a manufacturing town in the West Riding of Yorkshire, England, 16 mi. s. w. of Leeds. Among the chief buildings are

## Hudson Bay

the townhall and the market hall. The town has also a college, affiliated with London University, and other educational institutions. The city is one of the chief centers for the woolen manufacturing industry. Coal mining and stone quarrying are also important industries. This town was the first to adopt an eight-hour workday. Its importance dates from the eighteenth century, when the woolen manufacture was established. Population in 1911, 107,825.

**Hudson, MASS.**, a town in Middlesex co., 17 mi. n. w. of Worcester, on the Boston & Maine railroad. It has manufactories of rubber goods, clothing, leather and other products. The government is administered by officials chosen at town meetings. Population in 1910, 6743.

**Hudson, N. Y.**, county-seat of Columbia co., 28 mi. s. of Albany on the Hudson River and on the New York Central and other railroads. The city is beautifully situated on the slope of Prospect Hill. Prominent buildings are the State House of Refuge for Women, the state armory, the State Volunteer Firemen's Home and the Hudson Orphanage Asylum. The various industries include foundries, machine shops, creameries, lumber mills and manufactures of car-wheels, stoves and other articles. The place was settled in 1783, under the name of Claverack Landing. It was made a port of entry in 1790, and for many years it had an extensive foreign trade, which was almost completely destroyed during the War of 1812. Population in 1910, 11,417.

**Hudson, HENRY** (?-1611), an English navigator and explorer. He sailed from London in the year 1607, with only ten men and a boy, to discover the northeast passage, and proceeded beyond the 80th degree of latitude. Two later voyages for the same purpose were also fruitless, and in 1609, in the employ of the Dutch East India Company, he sailed for North America and discovered the Hudson River, which he ascended to about the site of Albany. In 1610 he sailed in an English ship named the *Discovery*, and, in an effort to find a northwest passage to Asia, discovered Hudson Strait and Hudson Bay, where he wintered; but his crew, after suffering many hardships, mutinied and set him adrift in a boat, along with his son John and seven of the most loyal of the crew, none of whom was ever heard from again.

**Hudson Bay** or **Hudson's Bay**, an extensive bay, or nearly enclosed gulf, connected with both the Atlantic and the Arctic oceans. It extends from about 51° to 64° n. latitude, or nearly 900

## Hudson River

miles. Inclusive of a southern extension, known as James Bay, it has an area of more than 400,000 square miles, and its average depth is 70 fathoms, or about 420 feet. Hudson Bay is navigable for four and a half months in summer (from the middle of June to the end of October), being obstructed by drift ice during the rest of the year.

**Hudson River**, an important river which rises in the northern part of the State of New York, in the Adirondack Mountains, and flows almost directly south, emptying into the Atlantic Ocean through New York Bay. Its whole course is over 300 miles, and it is navigable to Troy, 150 miles from its mouth, and for the largest vessels to Albany, 6 miles farther south. Tide-water extends to Albany, making the lower half of the river more properly an estuary. At Glens Falls the Hudson has a fall of 50 feet. Great commercial power is now developed here by means of a dam. Because of its beautiful scenery, especially along the lower half, where its banks are high and rocky, the river is often called the "Rhine of America." The Palisades, near its mouth, are considered one of the most beautiful natural formations on the continent. Many thriving towns are situated along the river's course. Mrs. Edward Harri-man conveyed to the state, recently, 10,000 acres of land opposite Peekskill on the west side of the Hudson River, as a park, with \$1,000,000 for the purchase of land lying between the tract and the river, on condition that \$1,500,000 be raised by subscription and \$2,500,000 be appropriated by the state for the purpose of acquiring other land and of making certain other improvements. The conditions have been met and the park is assured.

**Hudson River Tunnels.** See TUNNEL.

**Hudson's Bay Company**, an English trading company, chartered in 1670. It had long a monopoly of the trade throughout the whole territory of North America whose streams flow into Hudson Bay, and at one time as far westward as the Pacific, with rights of governing and making war. In 1869 its authority was transferred by act of Parliament to the Crown, and its territories were incorporated in the Dominion of Canada. Its trade in furs is still very large. See FUR AND FUR TRADE.

**Huerta**, *hwair'tah*, VICTORIANO (1844-1916), Mexican soldier and statesman. General Huerta is of pure Indian blood. Born of poor parents, he would probably have remained obscure but for a chance visit of some soldiers to his native village. The general in command needed a

## Hugli

secretary, and employed Huerta, whose ability so impressed the general that he took the boy to Mexico City. For many years he served in the army, but for good reasons seems to have been distrusted by Diaz. Yet when Diaz fled from Mexico in 1911, it was Huerta, then minister of war, who saw to his safe conduct, and even ordered the firing of a farewell salute. When Madero became president, Huerta was for a time commander of the federal troops, but he soon headed a counter-revolution which resulted in the overthrow and death of Madero. Huerta now became president, and maintained his authority for over a year, in spite of the opposition of the United States and of the revolutions of the Constitutionalists led by Carranza. On July 15, 1914, Huerta resigned and fled to Europe, where he remained until the next spring. He then settled near New York City, but after a few months started west, ostensibly to visit the exposition at San Francisco, but really to start a new revolt. In July, 1915 he was imprisoned at El Paso, Tex., for violating the neutrality of the United States. He was already in poor health; six months later he was released, to die outside the prison walls.

**Hughes**, CHARLES EVANS (1862- ), an American lawyer and statesman, born at Glens Falls, N. Y. He was educated at Colgate University, Brown University and the Columbia Law School. In 1891 he was elected professor of law in Cornell University; later he was lecturer at the New York Law School. He first came prominently before the public in 1904 in his investigation, as counsel to the legislative committee of New York, of gas, electric light and power companies, and later of the New York Life Insurance Company. In 1906 and again in 1908 he was elected governor of New York. In 1910 he was appointed an associate justice of the United States supreme court. In 1916 he received the Republican nomination for President and resigned. He lost the election and reëntered the practice of law.

**Hughes**, THOMAS (1823-1895), an English lawyer, author and philanthropist, born at Uffington, Berkshire. He is widely known for his novel, *Tom Brown's School Days*, a picture of school life at Rugby, published in 1856. It was followed by *Tom Brown at Oxford*, *The Scouring of the White Horse*, *Alfred the Great*, and other writings.

**Hugli**, *hoog'ly*, or **Hoogly**, a river of Hindustan, in Bengal, formed by the junction of the Bhagirathi and the Jalangi at Nadija, about



## Hugo

55 mi. above Calcutta, and constituting the principal channel of the Ganges delta. It is 15 miles wide at its mouth, but much encumbered by shoals. Ships drawing 22 feet ascend as far as Calcutta. Its total course is about 160 miles.

**Hu'go**, VICTOR MARIE (1802-1885), a great French poet, novelist, dramatist and politician. At the age of twelve he was already writing



VICTOR HUGO

verses; in 1822 he published the first volume of his *Odes and Ballads*, and in 1823 his first novel, *Hans of Iceland*, appeared, followed in 1825 by *Bug Jargal*. In 1826 a second volume of his *Odes and Ballads* appeared, and in these Hugo's anti-classical tendencies in style and treatment of subject became visible. The appearance of his drama, *Cromwell*, marked Hugo at once as the leader of the romantic school. *Hernani*, first presented in 1830, was a further attempt to overthrow the classic drama in France, and the result of its presentation was a great conflict between Romanticists and Classicists (See DRAMA). Other plays followed, *Marion Delorme*, *The King Amuses Himself*, *Lucrèce Borgia* and *Ruy Blas*; but Hugo was not greatly successful as a dramatist, and after 1843 he turned his attention to other work. During these years in which he was chiefly occupied with dramatic composition, he had also published a novel, *Notre*

## Huguenots

*Dame de Paris*, and several volumes of poetry, among them, *Autumn Leaves* and *Twilight Songs*. The poetry of this period has a melody and grace perhaps superior to any that he afterward wrote, but it lacks that deep and original sense of life which is characteristic of his later poems.

In 1841, after having been twice rejected, Hugo was elected a member of the French Academy, and in 1845 he was made a peer of France by Louis Philippe. The revolution of 1848 drew Hugo into the thick of the political struggle. At first he favored Louis Napoleon, but afterward, whether from suspicion of Napoleon's designs or from other reasons, he became one of the chiefs of the democratic party. After Napoleon's seizure of power, in 1851, Hugo was one of those who kept up the struggle against him to the last. Then, while in exile in Brussels, he produced the bitterly satiric *Napoleon the Little* and *The Chastisements*, attacks on the Second Empire. Hugo went from Brussels to Jersey, was expelled along with the other French exiles in 1855 by the English government and finally settled in Guernsey, where he remained until 1870. During these years in the Channel Islands he brought out *Les Misérables*, which appeared in ten languages on the same day; *The Toilers of the Sea*, and *The Man Who Laughs*, besides the collection of poems known as *Contemplations*. After his return to France he was made a member of the National Assembly, but soon resigned and went to Brussels, where, on account of the communistic character of his writings, he was not allowed to remain. When he was past seventy he published his *Ninety-three*, one of the strongest of his novels, and several collections of poems.

**Huguenots**, *hu'ge nots*, a term of unknown origin, applied by the Roman Catholics to the Protestants of France during the religious struggles of the sixteenth and seventeenth centuries. Under Henry II, 1547-59, the Protestant party grew strong, and under Francis II it became a political force headed by the Bourbon family, especially the king of Navarre and the prince of Condé. At the head of the Catholic party stood the Guises, and through their influence with the weak young king, a fanatical persecution of the Huguenots commenced. The result was that a Huguenot conspiracy, headed by Prince Louis of Condé, was formed, for the purpose of compelling the king to dismiss the Guises and accept the prince

## Huguenots

of Condé as regent of the realm. But the plot was betrayed, and many of the Huguenots were executed or imprisoned. In 1560 Francis died, and during the minority of the next king, Charles IX, it was the policy of the queen mother, Catharine de' Medici, to encourage the Protestants in the free exercise of their religion, in order to curb the Guises. But in 1562 an attack on a Protestant meeting made by the followers of the duke of Guise commenced a series of religious wars which desolated France almost to the end of the century. Catharine, however, beginning to fear that Protestantism might become a permanent power in the country, suddenly made an alliance with the Guises and between them they planned and carried out the massacre of Saint Bartholomew (Aug. 26, 1572). The Protestants fled to their fortified towns and carried on a war with varying success. On the death of Charles IX, Henry III, a feeble sovereign, found himself compelled to unite with the king of Navarre, head of the House of Bourbon and heir-apparent of the French crown, against the ambitious Guises, who openly aimed at the throne, and had excited the people against him to such a degree that he was on the point of losing the crown. After the assassination of Henry III, the king of Navarre was obliged to maintain a severe struggle for the vacant throne; and not until he had, by the advice of Sully, embraced the Catholic religion (1593), did he enjoy quiet possession of the kingdom as Henry IV. Five years afterwards he secured to the Huguenots their civil rights by the Edict of Nantes, which confirmed to them the free exercise of their religion and gave them equal claims with the Catholics to all offices and dignities. They were also left in possession of the fortresses which had been ceded to them for their security. This edict afforded them the means of forming a kind of republic within the kingdom, which Richelieu, who regarded it as a serious obstacle to the growth of the royal power, resolved to crush. War was waged from 1624 to 1629, when Rochelle, after an obstinate defense, fell before the royal troops; the Huguenots had to surrender all their strongholds, although they were still allowed freedom of conscience under the ministries of Richelieu and Mazarin. But when Louis XIV and Madame de Maintenon set the fashion of devoutness, a new persecution of the Protestants commenced. They were deprived of their civil rights, and bodies of dragoons were sent into the southern provinces to compel

## Hull

the Protestant inhabitants to abjure their faith. The Edict of Nantes was revoked in 1685, and by this act more than 500,000 Protestant subjects were driven out to carry their industry, wealth and skill to other countries. In the reign of Louis XV a new edict was issued, repressing Protestantism, but so many voices were raised in favor of toleration that it had to be revoked. The Revolution first put the Protestants on an equality with their Catholic neighbors.

**Hull**, the capital of Wright County province of Quebec, Can., on the Ottawa River, opposite Ottawa, Ont. The surrounding country contains both agricultural and mineral resources, and is traversed by the Canadian Pacific and the Pontiac Pacific railroads and by numerous electric lines. The principal manufacturing establishments are iron foundries, paper and pulp mills, pork-packing houses and lumber mills. The town was first settled in 1800 and became a city in 1870. It was almost destroyed by fire in 1900, but has since been rebuilt. Population in 1911, 18,217.

**Hull** or **Kingston-upon-Hull**, a river port of England, a county-borough, situated in the East Riding of York, at the influx of the Hull into the estuary of the Humber. The city's situation is on an unpicturesque plain, though the new portion of the city itself is well arranged and presents an attractive appearance. Among the important buildings are Trinity Church, built in 1412, the townhall, the market hall and the corn exchange. Hull is the seat of several educational institutions, none of which is of especial importance. The industries of the town are varied, comprising flax and cotton mills, ship building yards, rope and sail works, iron foundries, machine-making, seed-crushing, color-making, oil-boiling and many other and allied industries; but its importance arises chiefly from its shipping commerce, Hull being the third port in importance in the kingdom. The docks are among the largest in the world. The city owns the markets, the tramways, as the street car lines are called, the lighting plant, the water supply, libraries, baths, a sanitarium, a crematorium, cemeteries and a sewage disposal plant. Hull is an ancient town and was of some importance long before it received its charter from Edward I in 1298. It played a conspicuous part during the Civil War, being held by the Parliamentary forces and twice besieged without success. Population in 1911, 278,028.



## Hull

**Hull**, ISAAC (1773-1843), an American naval officer, born at Derby, Conn. In 1798 he became lieutenant in the United States navy, and he was steadily advanced in rank. When the War of 1812 broke out, he was commanding the *Constitution*. In his attempt to sail from Annapolis to New York, he escaped, by skilful seamanship, the close pursuit of five British vessels, and a month later he captured the British frigate *Guerriere* off Newfoundland. This victory, the first won by the Americans during the war, made Hull a popular hero.

**Hull**, WILLIAM (1753-1825), an American soldier, born in Derby, Conn., educated at Yale and admitted to the bar in 1775. He served in the American army during the Revolution, taking part in the battles of Trenton, Princeton, Saratoga, Monmouth and Stony Point, and attaining the rank of lieutenant colonel. He was elected to the state senate after the war, and in 1805 he became governor of the Territory of Michigan. At the outbreak of the War of 1812, he was made brigadier general and commanded the northwest. He immediately took the aggressive, but displayed mediocre military ability, and finally in August, 1812, he surrendered Detroit, after a brief resistance. He was court-martialed in March, 1814, and was sentenced to be shot, but President Madison remitted the penalty. It is now believed that the blame for the result of his campaign in the West lies fully as much with the misconduct of affairs at Washington as with Hull's management.

**Hull House**, a social settlement in Chicago, founded by Miss Jane Addams and Miss Ellen Starr in 1889. It is in the center of a poor foreign district, and from the first it was so successful and was conducted along such progressive lines that it became an acknowledged leader in the social settlement movement in the United States. See SOCIAL SETTLEMENTS.

**Humane Societies.** See CRUELTY TO ANIMALS, SOCIETY FOR THE PREVENTION OF.

**Hu'manists.** See PEDAGOGICS, subhead *Humanists*.

**Humbert I** (1844-1900), king of Italy, eldest son of Victor Emmanuel II. In the war of 1866, in which Italy joined Prussia against Austria, he took the field in command of a division and distinguished himself for his valor. In 1868 he married Marguerite of Savoy, and ten years later he succeeded his father on the throne. For a large part of his reign he was very popular with his subjects,

## Humboldt

but much of his popularity was lost by reason of the excessive taxation which he was forced to impose on the country. He was assassinated by an anarchist.

**Humblebee.** See BUMBLEBEE.

**Humboldt**, *hum'bohl't*, FRIEDRICH HEINRICH ALEXANDER, Baron von (1769-1859), a German traveler and naturalist, born at Berlin, where his father held the post of royal chamberlain. He studied at the universities of Frankfort-on-the-Oder, Berlin and Göttingen, and also at the commercial academy in Hamburg. His first work was *Observations on the Basalt of the Rhine*. In 1791 he studied mining and botany at the mining school in Freiberg, and subsequently he became overseer of the mines in Franconia. He resolved to make a scientific journey in the tropical zones and arrived in Cumana, in South America, in 1799, and spent five years in exploring scientifically the region of the Orinoco and the upper part of the Rio Negro, the district between Quito and Lima, the City of Mexico and the surrounding country and the island of Cuba. In 1804 he returned to Bordeaux, bringing with him an immense mass of fresh knowledge in geography, geology, meteorology, botany, zoölogy and every branch of natural science. Humboldt selected Paris as his residence, no other city offering so many aids to scientific study, and remained there, arranging his collections and manuscripts, till 1805, after which he visited Rome and Naples. He eventually returned to Paris, where he prepared his first great work, a mammoth account of his journeys in South America and their scientific results.

In 1827, Humboldt, who had been offered several high posts by the government of Prussia, and had accompanied the king on several journeys as part of his suite, was persuaded to give up his residence at Paris and settle at Berlin, where he combined the study of science with a certain amount of diplomatic work. In 1829, under the patronage of Czar Nicholas, he made an expedition to Siberia and Central Asia, which resulted in some valuable discoveries, published in his *Central Asia*. In 1845 appeared the first volume of the *Cosmos*, his chief work, a vast and comprehensive survey of natural phenomena, in which the idea of the unity of the forces of nature is thoroughly grasped.

**Humboldt**, KARL WILHELM, Baron von (1767-1835), a German scholar, brother of Humboldt the naturalist. He studied at Berlin, at Frankfort-on-the-Oder and at Göttingen.

## Humboldt River

After traveling in France and Spain and acting as Prussian minister at Rome, he was called to fill the office of minister of the interior in connection with ecclesiastical and educational matters, and he had a most important share in bringing about the educational progress which Prussia has since made. In 1810 he became minister plenipotentiary to Vienna, took an active part in the conclusion of the Peace of Paris (1814) and at the Congress of Vienna (1815) and other great diplomatic transactions. He was for a time ambassador to London, and in 1819 he was an active member of the Prussian ministry; but he resigned and retired to his estate at Tegel. His works include poems and literary essays, but by far the most valuable are his philological writings, such as *Researches Regarding the Original Inhabitants of Spain in Connection with the Basque Language*; *On the Kawi Language of Java*, and *On the Diversity of Language and its Influence on the Development of Speech*.

**Humboldt River**, a river of Nevada, rising in Elko County. It flows in a southwest direction and empties into Humboldt Lake in Churchill County, 80 miles northeast of Carson City. Its waters are saline. The length is estimated at 375 miles.

**Hume**, DAVID (1711–1776), an eminent English historian and philosopher. He was destined for the law, but was drawn away by his love of literature and philosophy, and retired to France, where during three years of quiet and studious life he composed his *Treatise upon Human Nature*. The work was published at London in 1738, but, in his own words, “fell deadborn from the press.” His next work, *Essays, Moral, Political and Literary*, met with a better reception. In 1746 and 1747 he accompanied General Sinclair in his expedition against France and in a military embassy to Vienna and Turin. He then published a recasting of his earliest work, under the title of an *Enquiry Concerning the Human Understanding*. In 1752 he published his *Political Discourses*, which were well received, and his *Inquiry Concerning the Principles of Morals*. The same year he obtained the appointment of librarian of the Advocates’ Library, at Edinburgh, and began to write his *History of England*, of which the first volume appeared in 1754. This was received with the highest praise and greatly increased his reputation.

As a philosopher, Hume exercised a great influence on the thought of his own generation

## Humming Bird

and of that which followed him. He contended that there could be no mental experience except sense impressions and the ideas which are the direct reproduction by memory of these impressions.

**Humid’ity**, in meteorology, the state of the atmosphere with respect to the amount of vapor it contains. The atmosphere is supplied with vapor by evaporation from the sea, rivers and lakes, the ground and plants. The amount of vapor that the air can contain depends upon its temperature, its capacity increasing as the temperature rises. When the air contains all the vapor that it can hold at a given temperature, it is said to be *saturated*. Next to oxygen and hydrogen, vapor is the most important constituent of the atmosphere. Dew, fog and rainfall depend upon its presence, and when existing in large quantities it is the principal cause of tornadoes and other violent storms. Vapor also equalizes the temperature. It reflects back to earth the heat which is radiated into the air, serving as a blanket to prevent the escape of heat. Without this prevention there would be much greater contrast between the temperature of day and night and of summer and winter than at present. The amount of humidity in the atmosphere is measured by the hygrometer. See **HYGROMETER**; **CLIMATE**; **CLOUD**; **DEW**; **FOG**; **RAIN**.

**Humming Bird**, a beautiful little bird, of which there are more than 400 species, living exclusively in America, abounding especially in the tropics. The name is given the birds because of the sound made by their rapidly moving wings in flight. Some humming birds are not larger than a bumblebee, and the largest do not exceed the sparrow in size. They have slender beaks, which are generally long and sometimes curved. The tongue is long, thread-like, forked at the point and capable of being protruded from the bill to a considerable distance. Humming birds never light to take food, but, hovering before a flower, supporting themselves by the rapid vibrations of their wings, they search the blossom for insects, which form a great proportion of



HUMMING BIRD



## Humperdinck

their food, and for the honey which the plants secrete. The little creatures are fearless, and will feed from the hand of a person who has gained their confidence. They build nests of wonderfully fine workmanship, which are lined within with soft wool and usually covered on the outside with lichens, which serve to conceal the nest. Two small eggs are laid, and they are always plain white. There are many species in the United States, but the only one found east of the Mississippi River is the *ruby-throated humming bird*. The tropical species vary remarkably in outward appearance. Some are plainly colored, while others are ornamented in numberless ways by brilliant patches of color on the throat, long graceful feathers in the tail, crests, ruffs, bunches of feathers upon the legs and a brilliant metallic luster to the feathers. The literature devoted to humming birds is very extensive, including several hundred titles.

**Hum'perdinck**, ENGELBERT (1854- ), a German composer, born near Bonn. He studied at Cologne to become an architect, but soon abandoned this plan to take up music. He was a special friend and protégé of Richard Wagner's for the last few years of the great composer's life and soon gained renown as a vigorous supporter of the modern movement in music, which was given its first great impetus by Wagner. He is, perhaps, best known by his opera *Hansel und Gretel*. Other compositions are the *Symphony in C* and *The Children of the King*. In all of his works his rendering of delicate folklore and fairy themes is particularly successful.

**Humphreys**, *hum'friz*, ANDREW ATKINSON (1810-1883), an American soldier, born in Philadelphia. He graduated at West Point in 1831 and served at different times in the army and as government and private civil engineer. He joined McClellan's staff in 1861, was made brigadier general of volunteers in 1862 and in September of the same year commanded a division of the fifth corps of the Army of the Potomac, serving at Fredericksburg, Chancellorsville, Gettysburg and in Grant's campaign in Virginia in 1864. He was promoted to be major general of volunteers in 1863, after the surrender received a regular major general's brevet, had charge of the district of Pennsylvania and later, as brigadier general, commanded the engineer corps. He retired in 1879.

**Hundred Days**, **THE**, the term applied to the second period of Napoleon's power, from March 20 to June 28, 1815. On receiving word at

## Hunkers

Elba that the restored Bourbon monarchy was unpopular in France and that the allies were unable to agree as to plans of settlement at the Congress of Vienna, he escaped from the island and returned to France. Great numbers joined him immediately, and he was able to force Louis XVIII to abdicate. He reorganized the government, with promises of liberal rule, and summoned an assembly to draw up a new constitution. The allies, however, promptly put a large army into the field against him, and at the Battle of Waterloo, which closed the campaign, he was defeated and forced again to abdicate.

**Hundred Years' War**, the name given to the struggle between France and England, which lasted with intermissions from 1337 to 1453. Edward III of England claimed the crown of France because his mother had been a sister of Charles IV of France, and this claim, together with minor differences, brought on the war. Although war was declared in 1337, there were no great battles fought until 1346, when, at the Battle of Crecy, the English gained a complete victory. Ten years later, at Poitiers, the French were again overwhelmingly defeated, but in spite of these advantages the English gradually lost ground and Du Guesclin succeeded in driving them from the country, so that when Charles VI came to the throne of France, England had practically no hold on the country. When, however, in 1415, war again broke out, France was so greatly disturbed by internal conflicts that she could make no head against her enemy, and Henry V was able in 1420 to compel Charles VI by the Treaty of Troyes to recognize him as his heir. Under the regency of the duke of Bedford, the uncle of the infant son and successor of Henry V, England continued to make headway in France, but in 1429, through the efforts of Joan of Arc, matters changed, and the English were gradually forced to relinquish their gains. By the close of the war Calais was the only French territory which remained in England's hands.

**Hun'gary**. See AUSTRIA-HUNGARY.

**Hunger**. See APPETITE.

**Hungerford**, **MRS.** MARGARET WOLFE (1855-1897), an Irish novelist, better known as The Duchess. Her novels include *Phyllis*, *Beauties' Daughters*, *A Maiden All Forlorn*, *A Mental Struggle*, *Undercurrents* and *Molly Bawn*. They have little literary value and are exceedingly melodramatic, but are on the whole cleverly written.

**Hunk'ers**. See BARNBURNERS.

## Huns

**Huns**, a nomadic and warlike people of the Mongolian race, part of whom entered Europe, probably in the fourth century after Christ. They continued to extend their dominion along the Danube till the time of Attila (424 A. D.), who, uniting the whole Hunnish power, became the most powerful prince of his time. His defeat near Châlons was the commencement of the decline of the power of the Huns, and within a generation after his death, in 453, the great Hunnish Empire had completely disappeared, and the race had been absorbed among other barbarous peoples.

**Hunt, HELEN FISKE.** See JACKSON, HELEN FISKE HUNT.

**Hunt, JAMES HENRY LEIGH** (1784-1859), an English poet and essayist. He was educated at Christ's Hospital, London, entered the office of his brother, an attorney, and afterward obtained a situation in the war office. In 1808, in conjunction with his brother John, he started the *Examiner*, which soon became prominent for the fearlessness with which public matters were discussed. *Foliage*, a collection of original poems and translations, appeared in 1818, and in 1819 the *Indicator* was started, a weekly journal on the model of the *Spectator*, which contained some of his best essays. In 1822 he went to Italy, on an invitation from Byron and Shelley, and, in conjunction with the former, carried on a newspaper called the *Liberal*, which proved unsuccessful and was shortly discontinued. Among Hunt's works may be mentioned *The Story of Rimini*; *PalFREY, a Love Story of Old Times*; *Legend of Florence*, a play; *Men, Women and Books*, and an *Autobiography*.

**Hunt, MARY HANNAH** (1830-1906), an American teacher and temperance reformer, born at South Canaan, Conn. She became interested in investigations of the nature and effects of alcoholic drinks and other narcotics on the human system, and as the result of her studies she advocated compulsory instruction in what is called *scientific temperance*, in the public schools of the country. Under her influence and direction laws regarding such instructions are on the statute books of Congress and of nearly every state of the Union. Similar laws have also been adopted in Canada, Chile and several other countries. Mrs. Hunt was the organizer and the superintendent of the department of scientific temperance instruction for the world's Christian Temperance Union. She was the founder and editor of *School Physiology*, a monthly journal.

## Hunt

**Hunt, RICHARD MORRIS** (1828-1895), an American architect, born at Brattleboro, Vt., the brother of William Morris Hunt. He studied architecture in Geneva, Switzerland, and Paris, and later traveled through Europe, Asia and Africa. Returning to America in 1855, he was made chief architect of the extension of the National Capitol. He also designed the Lenox Library, New York, the United States Naval Observatory at Washington, the Administration Building of the World's Fair at Chicago and many other buildings and monuments throughout the country. He also planned some of the finest private mansions in the United States, including that of W. K. Vanderbilt, New York, and the country home of George Vanderbilt, at Biltmore, N. C. He received many decorations from foreign learned societies and was recognized as one of the most influential members of his profession in the United States.

**Hunt, WILLIAM HOLMAN** (1827-1910), an English painter, one of the best of modern painters of religious subjects, born in London. He was trained in the Royal Academy school and began to exhibit in 1846. He belongs to the so-called Pre-Raphaelite school of English artists. In 1853 his *Claudio and Isabella* first attracted public attention, followed next year by the *Light of the World* (Christ bearing a light lantern). Mr. Hunt then made a journey to the East, the fruits of which are observable in the local coloring and strength of realization in his succeeding pictures of Eastern life, among which are *The Scapegoat*, *The Finding of the Saviour in the Temple*, *Shadow of Death* and *Triumph of the Innocents*. Hunt's pictures have been criticised for the minuteness of detail and the care with which everything is done, but they are full of strong feeling.

**Hunt, WILLIAM MORRIS** (1824-1879), an American painter, born at Brattleboro, Vt., and educated at Harvard University. He studied in Europe, where he became a close friend and follower of Millet. He returned to the United States in 1855 and became a teacher of painting in Boston. In all his work he showed a remarkable technic and a fine feeling for color. Among his most important paintings are *The Flight of Night* and other mural decorations in the New York State capitol at Albany, several portraits of famous Americans and numerous figure subjects, many of which hang in the Boston Museum, notably *Marguerite*, *The Hurdy-Gurdy Boy* and *Girl with the Kitten*. In later life he devoted himself to landscape painting.



## Hunter

**Hunter, DAVID** (1802–1886), an American soldier, born at Washington, D. C., and educated at West Point. He served on the frontier and in the Mexican War. During the Civil War he commanded a division at the first Battle of Bull Run and was seriously wounded, was afterwards appointed major general of volunteers, was given command of the western and southern departments in turn and came in conflict with the government at Washington by issuing a premature order for the abolition of slavery in the states of Georgia, Florida and South Carolina. He later served in West Virginia and in Virginia and at the close of the war was brevetted brigadier general and later major general in the regular army.

**Hunter, JOHN** (1728–1793), an eminent English surgeon, born at Glasgow, Scotland. After industrious and thorough study of anatomy he became house surgeon at Saint George's Hospital in 1756 and later was military surgeon in France and Portugal, where he stayed for two years. On his return to London he came into prominence at once and was regarded as the ablest physician of his day. One of his most important inventions was the cure of aneurism in an artery, by tying it on the side toward the heart. He collected various and numerous specimens in his large private museum, which, after his death, was purchased by the government and presented to the Royal College of Surgeons.

**Hunter, ROBERT MERCER TALIAFERRO** (1809–1887), an American politician, born in Essex County, Va., and educated at the University of Virginia. He entered politics in 1833, being elected to the state legislature, and four years later was chosen to Congress as a Democrat. He vigorously upheld the interests of the South in opposition to protection and to the national bank and became speaker of the House in the Twenty-sixth Congress. In 1847 he was elected United States senator and served until the Civil War, being expelled after his withdrawal in July, 1861. During this period he favored the slave power, was the author of the low tariff of 1857, and was a prominent candidate for the nomination for president in the Democratic convention of 1860. He was a member of the provisional Confederate congress and was then chosen secretary of state, but resigned to enter the Confederate senate, where he showed himself a warm adversary of President Davis. He was one of the Confederate commissioners who labored for peace in 1865, at what is known as

## Huntingdon

the Hampton Roads Conference. He took no part in national politics after the close of the war.

**Hunting**, a sport which has been popular with mankind from the earliest times and which is still indulged in by all civilized people, though for many years it has been considered sportsmanlike to hunt game animals during certain seasons of the year only and in such ways as to give the animal a fair show for its life. In fact, in most parts of the United States, as well as in most countries of Europe, there are game laws which forbid shooting during the breeding season and which sometimes restrict it to a very limited period each year. Certain animals which are destructive, however, may be hunted at all times, and in many states a premium is placed on their death. See **GAME**.

Since the invention of firearms the killing of game by shooting is the most common way. The use of dogs to detect the presence of game and to rouse it is common, though in some states the hunting of deer and other animals with dogs is forbidden. Among the game birds of the United States, those most sought for are the partridge, the grouse, the plover, the quail, the woodcock and various species of ducks, though in different localities there are other birds almost equally favored. Among the mammals, squirrels, hares, rabbits and deer are most highly regarded. In most states little restriction is placed on hunting squirrels and rabbits, but the open season for deer is very short, sometimes not exceeding fifteen days in the course of a year.

The refinements of modern life have taught us the charm that many wild animals possess and have led to the protection of song birds and other harmless creatures to such an extent that in many cities and towns the squirrels are familiar, everyday visitors to many homes, where they are fed and guarded by the children, instead of being hunted as they were formerly. The public schools have done much to educate children to see in the birds a beauty that is utterly destroyed when life is extinct, and accordingly a saner regard for them is growing among the people. So long as there is a demand for game for the table, or for furs and plumage for wear and decoration, there will be hunting for the market, and professional hunters and trappers will continue to make their living, but it is not probable that hunting as a sport will increase in popularity.

**Huntingdon, PA.**, the county-seat of Huntingdon co., 98 mi. w. of Harrisburg, on the Juniata River and on the Pennsylvania and other rail-

## Huntington

roads. The borough is in an agricultural and fruit-growing region and is near deposits of iron, coal, fire clay and limestone. The town contains flour mills and manufactories of machinery, stationery, knit goods, furniture and other articles. It is the seat of Juniata College and of the state industrial reformatory. The place was settled in 1760 on the site of a famous indian council ground. Population in 1910, 6861.

**Hunt'ington, IND.**, the county-seat of Huntington co., 24 mi. s. w. of Fort Wayne, on the Little River and on the Wabash and the Erie railroads. The city has extensive water power, and the manufactures include bicycles, shoes, pianos, agricultural implements and cement. There is also a trade in coal, lime and agricultural produce. It is the seat of a United Brethren college. Population in 1910, 10,272.

**Huntington, N. Y.**, a town of Suffolk co., on Huntington Bay of Long Island Sound, 30 mi. e. by n. of New York, on the Long Island railroad. The surrounding country is agricultural. The town has manufactures of pottery and brick, but it is of especial importance as a summer resort and residential suburb. Population in 1910, 12,004.

**Huntington, W. VA.**, the county-seat of Cabell co., 52 mi. w. of Charleston, on the Ohio River and on the Baltimore & Ohio, the Chesapeake & Ohio and other railroads. The city is an important commercial center with steamship connection on the river, and it has foundries, machine shops, packing houses, lumber and planing mills and manufactories of paints, glass, stoves and other articles. The West Virginia Asylum for Incurables and Marshall College, which is the state normal school, are located here. The place was settled in 1871 and was named in honor of Collis P. Huntington. Population in 1910, 31,161.

**Huntington, DANIEL** (1816-1906), an American artist, born in New York. He was educated at Hamilton College and studied under S. F. B. Morse and Inman. After a visit to Europe in 1839, he returned to New York and devoted himself to portraits, but executed also a great number of genre and historical pieces. Among his later works are *Philosophy and Christian Art* (1878) and *Goldsmith's Daughter* (1884). Among his portraits are those of President Lincoln and United States Senator John Sherman. Among his other works are *Lady Washington's Reception Day*, *Florentine Girl* and *Mercy's Dream*.

**Hunts'ville, ALA.**, the county-seat of Madison co., 100 mi. n. of Birmingham, on the South-

## Huron

ern and the Nashville, Chattanooga & Saint Louis railroads. The city is in the fertile Tennessee River valley and has an extensive trade in cotton, fruit and live stock. It is the most important cotton manufacturing center in the South. Foundries, machine shops, brickyards and various other manufactories are also located here. The city contains Huntsville Female College, the Huntsville Female Seminary, a state normal and industrial school and the Central Alabama Academy. Population in 1910, 7611.

**Hunyady, hun'yah dy**, JANOS (about 1387-1456), a national hero of Hungary. In all the wars against the Turks, which were agitating his country, he took a prominent part. When at the Battle at Varna, in 1444, the Hungarian king, Ladislas, was killed, Hunyady was made regent during the minority of the new king, Ladislas Posthumus. Four years later he was defeated at Kossovo in Servia and was held a prisoner for a time by the Servians. His greatest victory was one in 1456 over Mohammed II, the conqueror of Constantinople, who was attempting the siege of Belgrade. He died a few days after this battle. The credit for preventing the Mohammedans from establishing an empire in central Europe is due to Hunyady more than to any other one man.

**Hurd'ling.** See ATHLETICS.

**Hurd'y-gurd'y**, a medieval stringed instrument, played by turning a handle. Its tones were produced by the friction of a wheel acting as a bow against four strings, the length and pitch of which were regulated by the fingers or by keys. The name is also commonly applied to the street organ, or barrel organ, built upon the same principle, the wheel being replaced by a cylinder armed with pegs, which, as the cylinder is revolved, pick the strings or press valves in pipes, admitting air currents which produce the tones.

**Hu'ron**, a powerful tribe of indians that lived east of Lake Huron near Georgian Bay. When Champlain knew them in 1609, the Huron were allied to the Algonquian tribes and were at war with the Iroquoian, although the Huron naturally belonged to the latter group. Champlain, adopting the cause of the Huron, engaged in two expeditions against the Iroquois, in both of which he was successful. Naturally, the Huron became loyal allies of the French and accepted the teachings of the Jesuits, but the Iroquoian tribes, having learned the use of firearms, were too strong for their Huron enemies and ultimately drove the lat-



## Huron

ter out of their country. See IROQUOIAN INDIANS.

**Huron, LAKE**, one of the chain of five great lakes in the central part of North America. It lies between and connects Lake Superior and Lake Erie and also joins Lake Michigan. It washes the shores of the State of Michigan on the west and of the Province of Ontario on the east. Lake Huron lies 582 feet above sea level and is third in size of the Great Lakes, being about 250 miles long, 190 miles wide and from 200 to 700 feet deep, and having a total area of 22,322 square miles. The lake contains several thousand islands in its northern part, of which the largest is the Grand Manitoulin, which is about 107 miles long and from 4 to 25 miles wide. The waters of the lake are very clear, pure and cold and abound in fish. There are few good harbors, the best being Saginaw Bay and Thunder Bay on the west shore. Its principal ports are Goderich and Kincardine, Owen Sound and Collingwood, Ont., and Bay City, Saginaw and Cheboygan, Mich. There is a large arm of the lake on the east, known as Georgian Bay. See GREAT LAKES, THE.

**Hurricane**, the name of large revolving storms that form in the region of the West Indies. The term is also popularly, though incorrectly, applied to any wind having sufficient force to uproot trees and destroy buildings. The West Indian hurricanes are revolving storms, with a diameter, in the beginning, of from 100 to 300 miles. They occur only during the late summer and autumn, being most frequent in September and October, and are caused by the intense heat over portions of the sea where they originate.

The wind blows in a circular course, whose direction is contrary to that of the hands of a clock. In the center of the storm no rain falls, and as the current is upward, no wind is perceived. This area is characterized by a heavy sea and frequently by a clear sky, for which reason it is termed the *eye* of the storm. The intensity of the storm is greatest near the place of its origin and diminishes as the diameter of the circle covered increases. At the beginning the velocity of the wind is very great, being estimated in some instances as high as 200 to 300 miles an hour, and the rain falls in torrents.

These storms generally move toward the northwest until they reach the coast of the United States, when they turn toward the northeast and follow the coast from about the

## Husband and Wife

latitude of Cape Hatteras to Nova Scotia. As they advance their area increases and their violence diminishes, but they usually cause heavy rain or snow, and occasionally the wind is of such force as to cause considerable damage to shipping and to towns along the coast. The most extensive hurricanes extend inland as far as Indiana, but by the time a storm has reached this limit, its force has been expended. See CYCLONE; TORNADO; TYPHOON.

**Husband and Wife**, a man and a woman married to each other (See MARRIAGE). The legal relations existing between husband and wife have within two centuries undergone a marked change. According to the old English common law, at marriage the person of the wife was merged with that of the husband and all of her personal and property rights were transferred to him. Many of the common law principles, however, have been changed by the development of equity in England and of statute law in America, so that to-day the relations between husband and wife are in most respects those of practical equality.

Of the common law rules which still prevail, though in some ways modified by statute and equity, the following are of most importance: (1) It is the husband's right to determine the place of residence and the wife's duty to live with the husband, her legal residence being identical with his. (2) It is the husband's duty to provide support for the wife in accordance with his income and ability, and it is the wife's duty to render such domestic service as is reasonable and necessary. (3) The common law rule that at marriage the husband becomes the absolute owner of the personal property and has the management and obtains the profits of all the real estate of the wife is still in force in some jurisdictions, but has now been generally changed so as to allow the wife to possess a separate estate, over which she has general direction. The husband's right may also be somewhat limited by a pre-marriage or post-marriage settlement (See SETTLEMENT). (4) The husband is liable for debts contracted by the wife before marriage. (5) The husband is liable for civil offenses committed by the wife during married life. If these offenses or crimes are committed in his presence, the presumption is that they were done under coercion, and the wife is not found guilty unless this presumption is overcome. (6) The husband after marriage has the same power to make contracts as before, but the power of the wife in

## Huss

this direction is lost, except in cases involving her separate estate. She may, however, act as the agent of her husband in purchasing necessities for the home. (7) The wife cannot dispose by will of either real or personal property, except of her separate estate. (8) At marriage the wife attains a so-called *dower* right in an undivided one-third of the husband's real property. The latter therefore cannot convey real property without the consent of his wife, who thereby forfeits her dower right in the same. (9) Neither husband nor wife is a competent witness in cases in which the other is a party, except in certain cases instituted in order to secure protection of one against the other. (10) Formerly, neither husband nor wife could sue the other, the only remedy against civil injuries being in separation or divorce; but now the courts of most countries allow the wife to sue in equity for certain rights recognized in equity, such as those established by settlement. See DIVORCE.

**Huss, JOHN** (1373-1415), a religious reformer, born at Hussinecz, Bohemia. He studied philosophy and theology in the University of Prague, received the degree of A. M. in 1396 and became professor in the university in 1398. Later he was made dean of the philosophic faculty and preacher for the Bohemians in Bethlehem Church, having been ordained priest in 1401. The *Dialogus* of Wyclif, spuriously bearing the endorsement of Oxford University, was publicly read in Prague and so fascinated Huss that he translated it into Bohemian. His translation was widely circulated among the people and attracted considerable attention. Huss next openly denounced the censures pronounced by the Church on the heretical writings of Wyclif, and in his sermons he gave the latter unstinted praise, violently denouncing what he regarded as ecclesiastical abuses. Consequently, Pope Alexander issued a bull prohibiting preaching outside of collegiate, monastery and parish institutions. Huss defied the papal ban and was called to Rome by John XXIII to defend his principles. Refusing to comply with the summons of the pope, he was excommunicated in 1411. But setting aside all authority, he undertook, together with Jerome, a public denunciation of papal indulgences. For this action he was expelled from Prague. In exile he wrote his *Tractatus de Ecclesia*, which denied all Church authority. Through the influence of the pope, King Wenceslaus and Emperor Sigismund prevailed on Huss, under promise of a

## Hutchinson

safe conduct, to present himself before the Council of Constance, which opened on November 5, 1414. The pope, in order to free Huss from all embarrassment, withdrew the ban of excommunication, and to save him from external influence, caused him to be placed in the Dominican monastery near Lake Constance. He had three hearings before the Council, which condemned his doctrines and turned him over to the civil authorities, "praying that his life be spared and he be condemned to perpetual imprisonment." Huss was not allowed to speak in his own behalf nor to have any one speak for him. The laws of the Empire at this time regarded heresy as a civil offense and provided death for refusal to retract it. Huss was accordingly condemned to be burned at the stake. This sentence was executed July 6, 1415, and his ashes were thrown into the Rhine.

**Hussites**, the followers of John Huss (See HUSS, JOHN). After the death of Huss, his adherents took up arms for the defense of their principles, and under the leadership of Ziska, captured Prague, fortified Mount Tabor and repeatedly defeated the troops sent against them by the emperor Sigismund, who had succeeded to the crown of Bohemia. Ziska died in 1424 and was succeeded by Procopius, who also distinguished himself by many victories. The excesses of this party, however, who were called the Taborites, alienated the moderate Hussites, who called themselves Calixtines. These latter, after gaining certain concessions, such as the preaching of the gospel in the Bohemian tongue and the reform of clerical abuses, finally united with the Catholics by the Compactata of Prague in 1433, to acknowledge Sigismund as king. The Taborites afterward declined as a political party, finally becoming merged in the Bohemian Brethren.

**Hutch'inson, KAN.**, the county-seat of Reno co., 40 mi. n. w. of Wichita, on the Arkansas River and on the Missouri Pacific, the Atchison, Topeka & Santa Fé and the Chicago, Rock Island & Pacific railroads. It is a beautiful and growing city, near the center of the salt industry of the state, and it also has an important trade in live stock and agricultural produce. The salt supply seems practically unlimited, and the several plants turn out from 4000 to 6000 barrels daily. Other industries are meat-packing and manufactories of machinery, automobiles, boilers and other articles. The state industrial reformatory is located here. The



## Hutchinson

place was settled in 1872 and was incorporated two years later. Population in 1910, 16,364.

**Hutchinson, ANNE** (about 1590–1643), a religious enthusiast in colonial America, born in Lincolnshire, England. She married William Hutchinson and in 1634 went to Boston, Mass. She had peculiar theological views, held meetings, lectured and denounced the Massachusetts clergy. She was tried for heresy and banished from the colony, and with some of her friends she went to Rhode Island and started a settlement at Portsmouth. At the death of her husband she went to a new settlement in New York, where she and her daughters were massacred by the Indians.

**Hutchinson, THOMAS** (1711–1780), the last royal governor of Massachusetts. He was born in Boston and graduated from Harvard University, entered a business career and amassed a comfortable fortune. He early became prominent in government affairs and was rapidly promoted by the suffrage of his constituents until he became lieutenant governor and finally chief justice of the colony. While occupying this office he issued the famous Writs of Assistance. He opposed the Stamp Act on the grounds of expediency, but considered it legal and constitutional and labored earnestly to enforce it, thus incurring the antagonism of the people. His house was sacked during this period and many valuable books were destroyed. He became governor in 1770, was extremely unpopular and when military law was proclaimed in 1774 went to England, where he lived until his death. His *History of Massachusetts Bay* in three volumes is one of the most valuable histories of colonial times.

**Hutton, LAURENCE** (1843–1904), an American essayist and critic, born in New York City. From 1872 to 1874 he was dramatic critic of the *New York Evening Mail*, and from 1886 to 1898 he was literary editor of *Harper's Magazine*. He had a prominent part in the formation of the Authors' Club and of the International Copyright League. His works include *Plays and Players*, *Curiosities of the American Stage*, *Actors and Actresses of Great Britain and the United States*, written in conjunction with Brander Matthews. He also published a set of *Literary Landmarks* of various European cities.

**Huxley, THOMAS HENRY** (1825–1895), a famous English naturalist. He was graduated from the University of London in 1845 and entered the royal navy as assistant surgeon the next

## Hyacinth

year. He sailed with H. M. S. *Rattlesnake* on a surveying expedition to Australasia, during which he sent a number of valuable papers to the Royal Societies. He was at different times professor of natural history in the school of mines, Fullerian professor of physiology to the



THOMAS HENRY HUXLEY

Royal Institution, Hunterian professor in the Royal College of Surgeons, president of the British association meeting held at Liverpool in 1870, lord rector of Aberdeen University in 1872, secretary of the Royal Society substitute professor of natural history for Professor Wyville Thompson, at Edinburgh, a member of various royal commissions and inspector of salmon fisheries. He resigned this and almost all his other offices in 1885 on account of ill health. Among his works are *The Oceanic Hydrozoa*, *On the Theory of the Vertebrate Skull*, *Man's Place in Nature*, *On Our Knowledge of the Causes of the Phenomena of Organic Nature*, a series of lectures to working men, delivered in 1862, *Elements of Comparative Anatomy*, *Elementary Physiology*, *Introduction to the Classification of Animals*, *Critiques and Addresses*, *American Addresses*, *Physiography* and *Anatomy of Invertebrate Animals*.

**Hyacinth**, *hi'a sinth*, a genus of bulbous plants, belonging to the lily family and including about thirty species, among which the garden hyacinth is celebrated for the immense varieties



## Hyatt

which culture has produced from it. It is a native of the eastern shores of the Mediterranean Sea and was first cultivated as a garden flower by the Dutch, about the beginning of the sixteenth century. The drooping, bell-shaped flowers of almost all colors, both double and single, grow on an erect stock from the center of the plant. An old Greek myth accounts for the origin of the flower as follows: Apollo, the Greek god, had as a friend a beautiful youth named Hyacinthus, who was killed one day in a game of quoits. As a token of his love for the youth and sorrow at his death, Apollo caused a beautiful purple flower to spring from the drops of blood that fell from the brow of Hyacinthus.

**Hy'att**, ALPHEUS (1838-1902), an American naturalist. He graduated at Harvard College and at the outbreak of the War of the Rebellion entered the army and obtained the rank of captain. After the war he resumed his studies and served in various scientific positions in the East. Later he was made custodian of the collections of the Boston Society of Natural History, and in 1881 he became curator. He was a member of various scientific societies and was one of the editors and founders of the *American Naturalist*. His most important work was among the fossils of invertebrate animals, and in his studies he collected many facts which went far toward establishing the theory of evolution. Most of Hyatt's works are of a scientific character. One of the best known is a classification of fossils.

**Hyde Park**, MASS., a town in Norfolk co., 8 mi. from the statehouse in Boston, on the Neponset River and on the New York, New Haven & Hartford railroad. It has a beautiful location and extensive manufactories of cotton, woolen and rubber goods, paper, machinery and other articles. Population in 1910, including several villages, 15,507.

**Hyderabad**, *hi'dur a bahd'*, a city, the capital of a native state of the same name, also



HYACINTH

## Hydra

called the Nizam's Dominions, in southeastern India, east of Bombay. It is situated on the River Musi, at an elevation of 1672 feet above the sea. Among the chief buildings are the extensive palace of the nizam; the house of the British resident and adviser; the Char Minar, or Four Minarets, built about 1590 as a Mohammedan college, but now used for warehouses; the Jama Masjid, or cathedral mosque, designed after the one at Mecca. The city is an important railroad and commercial center and has manufactories of silks, trinkets and turbans. Population in 1911, 500,623.

**Hy'der Ali**, *ah'le*, (about 1720-1782), a distinguished Indian prince, son of a general in the service of the rajah of Mysore. By his military talents he became the actual ruler of Mysore, and in 1762 he deposed the rajah and had himself chosen to that position. He encouraged agriculture and commerce, reorganized the army and so greatly extended his dominions that in 1766 they contained 84,000 square miles and afforded an immense revenue. He was engaged in two wars with the British.

**Hydra**, *he'dra* or *e'dra*, an island of Greece, lying about 4 mi. off the southeast coast of Argolis, in the Peloponnesus. It is about 11 miles long and 3 miles broad. The coast is rocky and steep, having an elevation of 1800 feet, and the surface is barren. The chief town and seaport is Hydra. In ancient times the island was a dependency of the city of Hermione, and during the fifteenth and sixteenth centuries fugitives from different parts of Greece settled it. In the Grecian war of independence the people took a most active part, contributing most liberally to the cause of patriotism. After 1820, the islanders were considered the richest in the Aegean Sea. They carry on an extensive trade with England, the Baltic and even America. Lately, however, this has declined, and the population now is estimated at only 7000.

**Hy'dra**, in Greek mythology, a celebrated monster which lived in the neighborhood of Lake Lerna, in the Peloponnesus. Some accounts give it a hundred heads, others fifty and others nine, but all agree that as soon as one head was cut off, two others immediately grew in its place, if the wound was not seared by fire. To destroy this monster was one of the labors of Hercules, and he succeeded only with the assistance of Iolaus, who, as each head was cut off, applied a burning iron to the wound. The central head, which was immortal, Hercules buried under a stone.



## Hydra

**Hydra**, FRESH-WATER, or **Fresh-water Polyp**, a small animal, found in pond water. It can be seen easily with the naked eye, as it is about the thickness of fine sewing-cotton and has a length of from one-quarter to one-half of an inch. Hydras are found adhering by one end to twigs or weeds in the water. On the other end are a number of very delicate threads or filaments, called *tentacles*. If the hydra is watched under a microscope, it will be noticed that its form is continually changing. Sometimes it extends itself so much that its length is sixteen times its diameter and the tentacles



FRESH WATER HYDRA

appear like long, delicate filaments. At another time it contracts itself into an almost globular mass, and the tentacles appear like little blunt knobs. Besides these two movements, the hydra is able to go slowly from place to place. It is a voracious creature. When a water flea or any other living thing that may serve as food touches one of the tentacles, it becomes suddenly paralyzed by the barbed stinging cells which are literally shot out of the tentacle into the body of the animal, causing it to adhere to the tentacle. This tentacle and the others gradually contract until the prey is brought near the mouth of the hydra, which expands widely and draws the prey down into the digestive cavity. Hydras reproduce by budding. If a hydra be cut in two, it appears that within certain limits each portion will develop into a complete animal. See COELENTERATA.

**Hydrangea**, *hi dran'je ah*, a genus of shrubs or herbs, belonging to the saxifrage family and containing about thirty-three species, natives of Asia and America. The garden hydrangea is a native of China and was introduced into Great Britain by Banks in 1790. It is a favorite plant,

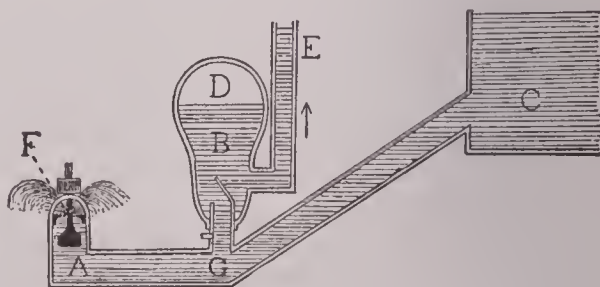
## Hydraulic Ram

because of the beauty and size of its flowers, which are white, pink or blue in color.

**Hydrau'lic Engine**, an engine operated by water under pressure. When the water is applied in such a way as to produce a direct rotary motion, the machine is usually termed a water wheel or water motor (SEE WATER WHEELS; TURBINE WHEEL). The term engine is more strictly applied to a water motor which operates on a plan similar to that of the steam engine, that is, being constructed with cylinders, pistons and valves (See STEAM ENGINE). The water is admitted and withdrawn alternately at opposite ends of the cylinder and forces the piston from one end to the other. The piston rod is connected with a crank on the shaft, and its reciprocating motion is thus changed to a rotary motion when this is necessary. Hydraulic engines of this sort are occasionally used where a slow, steady motion and considerable power are required, as in operating hoisting cranes in foundries and working certain patterns of elevators, but the introduction of the electric motor has largely displaced them for the latter purpose. A more common form of hydraulic engine is seen in the machines used for pumping the bellows of large organs by water power. This engine is really a pump, and the reciprocating motion of the piston is transferred directly to the lever which works the bellows, no rotary motion being necessary.

**Hydraulic Press.** See HYDROSTATIC PRESS.

**Hydraulic Ram**, a machine for using the force of a stream of water to raise a portion of



the stream to a level higher than that of the ram. In the figure, C represents the reservoir and G the pipe through which the water flows. At A the pipe is turned upward and flows by a cone-shaped valve, usually made of iron. At G there is a pipe connecting with an air chamber, D. The entrance to this chamber is through the valve B. The working of this machine is as follows: When the water begins to run through the pipe G, the valve is in its lowest position and allows the water to flow out through the orifice F. This flow continues until the force of the stream

## Hydraulics

of water through the pipe is sufficient to raise the valve and close the orifice. When this is closed, the flow of water in G suddenly stops and the force of the current is such as to drive a portion of the water through the valve B into the chamber. As soon as the flow in G stops, the valve at F again falls to its first position and the flow is again started. The water is forced into the delivery pipe E, and a constant flow is maintained by the elastic force of the air in D.

Hydraulic rams are used where the source of water is below the level of the place in which the water is required for use. Only a small portion of the water which flows through G passes through the valve at B; therefore these machines are not practicable, except where the quantity of water at the source is much greater than that needed for use.

**Hydraulics** the science which treats of the laws of flowing liquids. Two general principles are always considered in applying these laws. They are:

(1) The velocity of a jet of water is equal to that of a body falling from the surface of the water. If a jet flows from a dam ten feet below the surface of the water, it will have the same velocity as a stone which has fallen ten feet.

(2) A jet of water will rise to the level of its source. If a cistern is on a support twenty-five feet high and a pipe is attached leading to the ground and having an opening bent upward, the jet issuing from the pipe theoretically will rise as high as the surface of the water in the cistern. Because of friction and the resistance of the air, however, this result will not be quite obtained. The practical application of the laws of hydraulics has given rise to the science of hydraulic engineering. See **HYDRAULIC RAM**; **HYDROSTATICS**; **WATER WHEELS**.

**Hydrocarbons**, a series of compounds which consist of carbon and hydrogen only. They are produced chiefly by the decomposition of organic substances, either slowly by natural causes or by artificial means, as in the case of the destructive distillation of coal for the purpose of making gas. Certain of the hydrocarbons are also found in the gums which exude from trees. Hydrocarbons are the simplest of the carbon compounds and are commercially of considerable importance, forming the principal part, as they do, of turpentine, benzine, paraffin, petroleum, illuminating gas and gutta-percha.

**Hydrochloric**, *hi'dro klor'ik*, **Acid** or **Muriatic Acid**, a gaseous compound of equal volumes of hydrogen and chlorine. It is set free

## Hydrogen

during volcanic eruptions and is found in the water which collects in the crevices of mountains, as well as in rivers which take their rise in volcanic formations, especially in South America. It may be produced by decomposing common salt with sulphuric acid or by bringing equal volumes of chlorine and hydrogen together and exposing the mixture to diffuse daylight. It explodes in direct sunlight. Hydrochloric acid is colorless and has a pungent odor and an acid taste. It is quite irrespirable, extinguishes flame and dissolves very readily in water. The chief use of hydrochloric acid in the arts is to supply chlorine to the bleaching powder manufacturer. It is also used in the preparation of glue, phosphorus, carbonic acid and artificial waters. In medicine it is used diluted as a tonic and astringent. In a concentrated form it is a powerful caustic.

**Hydrocyanic**, *hi'dro si an'ik*, **Acid**. See **PRUSSIC ACID**.

**Hydrofluoric Acid**, an acid which may be obtained either in liquid form or in the form of a colorless gas. Both the dry and the liquid forms are active poisons and act upon the skin with great virulence. Hydrofluoric acid is used chiefly for etching upon glass. The glass is covered with a thin coating of etching wax, and the design is traced through the wax down to the glass with a fine-pointed instrument. The plate is then treated either with an aqueous solution of the acid or is exposed to the gas itself. After a sufficient length of time the wax is dissolved away and the design becomes visible. In chemistry, hydrofluoric acid is used to decompose and dissolve silicates in mineral analysis.

**Hydrogen**, *hi'dro jen*, an important elementary substance, one of the elements of water and a component of all vegetable and animal products. It may be obtained by passing the vapor of water over red-hot iron filings, or by submitting water to the action of an electric current, whereby it is decomposed into its elements, hydrogen and oxygen. Pure hydrogen is a colorless, tasteless, inodorous gas; it is very inflammable, burning with a pale, very slightly luminous, but intensely hot, flame; it is a powerful refractor of light. Hydrogen is the least dense and the most rapidly diffusible of all the gases and the lightest body in nature, being about one-fifteenth as heavy as atmospheric air. In consequence of its extreme lightness it is regarded as unity in referring to the atomic weight of bodies, and it has also been assumed as the unit in speaking of the specific gravity of gases,



## Hydrogen Dioxide

although common air is the more generally received standard. Hydrogen cannot support respiration, but is not directly poisonous. Two volumes of hydrogen with six of air form an explosive mixture. The most intense heat that can be produced is caused by the burning of hydrogen in oxygen gas, and this principle has been applied to increase the temperature of blast furnaces in iron works by making the gases pass separately through heated tubes to the furnace. Hydrogen is only slightly soluble in water, nor is there any other liquid which is capable of dissolving it in great quantity. It unites with all other elementary gaseous bodies, and it forms with them compounds, not only of great curiosity, but of vast importance and utility; with nitrogen it forms ammonia; with chlorine it forms hydrochloric acid, and with fluorine it forms hydrofluoric acid.

**Hydrogen Dioxide or Oxygenated Water or Peroxide of Hydrogen**, a compound of hydrogen and oxygen which contains twice as much oxygen proportionately as water. It is found in small quantities in the juices of some plants and in rain water and snow. When the water which accompanies the artificial hydrogen dioxide has been evaporated, there is left an oily liquid which is colorless and odorless, but which has a bitter taste and will blister the skin if brought in contact with it. Hydrogen peroxide is a particularly valuable bleaching agent, and as a medicine it has proved an excellent antiseptic. It is used in cases of diphtheria, and, taken internally, it has proved an aid in cases of indigestion. Compounds advertised to bleach the hair are usually based on dilute solutions of this substance.

**Hydrogen Sulphide**, *sul'fide*. See SULPHURETED HYDROGEN.

**Hydrography**, *hi drog'ra fy*, that branch of geography which has for its object the description of the water on the surface of the globe, whether in seas, lakes or rivers. It may deal with the rivers, watersheds and lakes, of a particular country; and it may also embrace the determination of winds, currents and other departments of marine surveying. Great Britain, France, the United States and other leading countries maintain hydrographic departments, under whose direction soundings, coast surveys and other maritime affairs are conducted.

**Hydrom'eter**, an instrument for measuring the specific gravity of liquids. The hydrometer in common use consists of a small glass tube, enlarged at the lower end so as to form two

## Hydrostatic Press

bulbs, one above the other. A weight, usually consisting of mercury or shot, is placed in the lower bulb to keep the instrument in an upright position. The upper part of the tube, which forms the stem, is marked with a graduated scale, zero being the point to which the hydrometer sinks when immersed in water. If immersed in a liquid heavier than water, it will not sink to the zero point, while, if immersed in a lighter liquid, it will sink beyond this point. Special hydrometers are manufactured for different purposes, such as for ascertaining the purity of milk and alcohol.

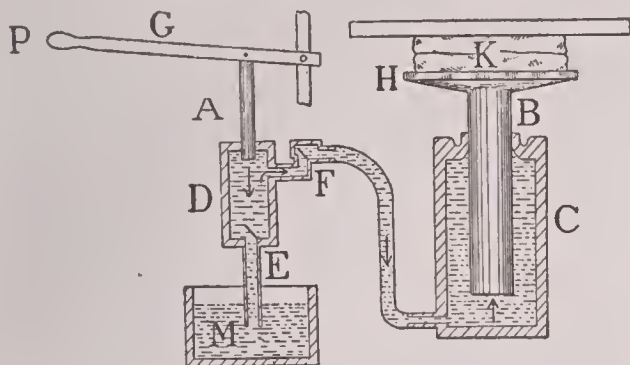
**Hydrophobia**, *hi dro fo'be ah*, a terrible disease arising from the bite of a rabid animal. The animals most liable to be afflicted with madness are dogs; but cats, wolves, foxes and other animals are also subject to it. The treatment of the disease consists in preventing its development, which may be effected by applying a ligature, if possible, above the wound to impede the circulation from the wound; by sucking it, if the membranes of the mouth have no wounds or sores, or by thoroughly cauterizing the wound, either with nitrate of silver or with iron heated to a white heat, the pain of cautery being less as the temperature is greater. If these means are not available, any burning substance and most acids may be used. Promptness of action is always necessary. Pasteur discovered a method of preventing the development of the disease by a system of successive inoculations with virus of greater and greater intensity. Institutes for the care of patients have been established in many of the large cities in the United States and other parts of the world.

**Hydro-aeroplane**. See FLYING MACHINE.

**Hydrostat'ic Press or Hydrau'lic Press**, a machine which operates by the pressure of water and depends upon the principle that liquids transmit pressure equally in all directions. The working of the hydrostatic press is illustrated in the accompanying diagram. The machine consists of two pistons, A and B, fitted with watertight collars to their respective cylinders, C and D. The piston and cylinder A and D, together with the valves E and F, constitute a force pump, which is connected by a pipe with the cylinder M. The piston B is fitted with a platform H, which, when the press acts, is forced upward towards the plate. The object to be pressed, K, is placed upon the platform. The piston A is worked by the handle G, which is so attached as to constitute a lever. The power is applied at P. By working the piston A, water is pumped from M

## Hydrostatics

into the cylinder D and thence into the cylinder C, raising the piston B. If the cylinder A has an area of one square inch and the cylinder B has an area of a hundred square inches, every



pound of pressure applied at A will produce one hundred pounds of pressure upon B. By the lever attachment of the handle G, a pressure of one pound at P will produce a pressure of five hundred pounds upon B.

The hydrostatic press is used in pressing cotton, raising heavy weights and for other purposes where great force is required. See HYDROSTATICS.

**Hydrostat'ics**, the science which treats of liquids at rest. Some authorities also include hydraulics under hydrostatics. The laws of hydrostatics are those governing the pressure of liquids, of which water is taken as the type. The most important of these laws are:

(1) Liquids carry pressure equally in all directions. Given, a bottle whose neck will just fit a cork having an area of one square inch. Fill the bottle with water and press down on the cork with a force of one pound; the pressure on the bottle will be equal to as many pounds as there are square inches in its surface. If it has an area of one hundred square inches, the pressure will be one hundred pounds.

(2) The pressure increases with the depth of the liquid. At the surface the pressure is nothing. At the bottom the pressure for any area is equal to the weight of a column of water of the same area extending to the surface. This principle must be taken into consideration in the construction of pipes which are to stand in a vertical position; also, in securing the flow of water for the purpose of turning water wheels, as turbines.

When these two laws are combined, they explain some very curious facts concerning water. It is in accordance with these principles that the water in a small tube will sustain the pressure of that in a large tube, when both are connected

## Hyena

with the same vessel. The water in the spout of the teakettle remains at the same height that it is in the kettle. It is also in accordance with these laws that we account for the great pressure exerted upon tanks, cisterns or boxes that are connected with standpipes which extend to a great height. If an ordinary cask be filled and an upright iron pipe one inch in diameter and thirty feet long be connected with it and also filled with water, the pressure upon the cask is sufficient to burst it.

(3) When a body is immersed in a liquid, the pressure upon it is equal to the weight of the liquid displaced. For instance, a cubic foot of water weighs  $62\frac{1}{2}$  pounds. If a box having a capacity of a cubic foot and weighing  $2\frac{1}{2}$  pounds be immersed in water, it can contain 60 pounds of sand before it will sink.

**Hy'drosulphu'ric Acid.** See SULPHURETED HYDROGEN.

**Hy'drother'apy**, a method of treating disease by the use of water. Few physicians now think that proper water treatment can be a cure for everything, yet most physicians use it in a great variety of cases. By applying pure hot or cold water it is possible to cleanse exposed tissues, to drive away excess of blood from one part of the body, or to call blood to the place where it is needed. Water affects all secretions of the body in a cleansing and stimulating way. Sprains, sore throat, tonsillitis and other diseases are relieved by compresses of cold or hot water, and fevers are reduced by bathing or by water packs. In this country and Europe are numerous well-appointed institutions where hydropathic treatment can be administered in its most approved form, and these institutions are frequented by patients suffering from the diseases that yield most readily to water treatment. See BATHS AND BATHING.

**Hyena**, *hi e'na*, a genus of carnivorous animals, resembling both the cat and the dog, living in Africa and in southern and central Asia. The fore legs are longer than the hind legs, and the animal moves with a swinging, shambling gait. The eyes are large and prominent, the ears are long and acute and the jaws are remarkable for the strength of their muscles. Not only is the animal ugly in appearance, but its odor is sickening and its voice at night resembles a horrible laugh. There are three species known—the *striped hyena* of western Asia, the *spotted hyena*, an African species, yellowish in color with numerous dark spots, and the *brown hyena*, dwelling on African coasts. All are nocturnal animals and



## Hygeia

are extremely voracious; they feed chiefly on carrion and are thus of great use in the countries where they live. Along with the true hyenas, the aard-wolf of South Africa is also included in



HYENA

the same family. An extinct species was abundant in England, France and Germany before the glacial epoch and has left its remains in many caves of these countries.

**Hygeia**, *hi ge'yah*, the Greek goddess of health, daughter of Aesculapius, with whom she was often associated in worship. She was represented as a blooming maid, with a bowl in her hand, from which she fed a snake, the symbol of health.

**Hygiene**, *hi'ji en* or *hi'jeen*, is that branch of medical science which deals with the preservation of health. While it is founded on medical experience and advanced by medical research, it does not deal with medical or surgical cases. The history of hygiene begins far back in the history of mankind. Among the Jews and the peoples of Assyria and India the priest enforced laws of health in respect to food, isolation of the sick and the removal of waste matter. The length of life of the modern Jew may be due to his following the laws of his forefathers. In Greece the physician enforced the laws of health, which were not so scientific as those of the Jews. The Romans had no laws for protecting the individual. Laws were early made concerning lepers, isolating them and burning their houses. England in 1532 appointed a commission for "the cleaning of rivers, public streams and ditches," but the country was visited by the plague in 1625 and again from 1629 to 1631. In the eighteenth century three persons were conspicuous in connection with the advance of hygiene: John Howard, in his work of cleaning English jails and so greatly reducing the cases of typhus, or jail fever; Captain Cook, in his discovery that scurvy was due to improper food, thus saving the life of many sailors; Lady Mary Wortley Montagu, in introducing the method

## Hygrometer

of inoculation into England, and so modifying the effects of smallpox (See VACCINATION). Since the eighteenth century, much knowledge as to the causes of disease and its spread has been gained and diffused by the study of climate and its effects, by the use of the microscope, by inquiry into the nature of the different foods and by investigation of the soil under dwellings. These things have led to laws concerning the ventilating of tenements, the cleaning of streets, the inspection of public conveyances, whose dust is the source of many diseases of the throat and lungs, and the sanitary construction of homes, with regard to closets, drains, baths and lavatories.

The individual also has a duty in preventing disease. He must be scrupulously clean in his personal habits; those who have charge of a home must look after the character, quality and quantity of food and its adaptation to the different members of the family, according to age, state of health and occupation; the clothing of beds and persons must be carefully and regularly cleaned and aired; the minds of the young must be directed in the lines that will fit them for the duties of adult life; school rooms must be well lighted and ventilated, and the books must be of such a character that they will not tax the eyes. See ANTITOXIN, BACTERIA AND BACTERIOLOGY; GERM THEORY OF DISEASE; QUARANTINE; SANITARY SCIENCE; SERUM THERAPY; SEWAGE AND SEWERAGE; TUBERCULOSIS; HEATING AND VENTILATION.

**Hygrom'eter**, an instrument for measuring the amount of moisture in the atmosphere. The hygrometer used by the United States weather bureau consists of a glass tube with a bulb at each end, one of colored glass, or of glass painted black, and the other of plain glass. The colored bulb contains ether and a thermometer; the other is covered with a cap of muslin or with a wick, one end of which dips into a vessel of water. When the instrument is manufactured, the ether is placed in the larger bulb and raised to the boiling point, so as to expel the air from the tube, which is then sealed, leaving a vacuum as the ether cools. The principle upon which this instrument works is that of condensation of moisture in the atmosphere by the lowering of temperature. The water drawn up by the wick which covers one bulb evaporates and reduces the temperature, and this causes the continuous evaporation of ether in the other bulb and so reduces the temperature of this bulb that moisture from the atmosphere gathers upon the glass.

## Hyksos

as it does upon a pitcher of ice water. The thermometer in the ether bulb shows the temperature at which this condensation begins to form, while a thermometer on the stand shows the temperature of the atmosphere. By combining the readings of the two thermometers, and by means of tables which have been carefully worked out, the relative amount of moisture can be ascertained.

**Hyksos**, *hik'soze*, the name given to a dynasty of kings which usurped the power in Egypt about 1700 B. C. See EGYPT, subhead *History*.

**Hymen**, the god of marriage in Grecian mythology, usually considered to be the son of Apollo. No marriage took place without his being invoked to sanction it. He is described as having around his brows the flowers of marriage, in his left hand the flame-colored nuptial veil, in his right the nuptial torch and on his feet golden sandals.

**Hymenoptera**. See INSECTS.

**Hymns**, NATIONAL. This term is given two distinct meanings. It signifies, first, the popular tunes or songs which are peculiar to a certain people or which are universal among them; second, the hymn or hymns which, by legislative enactment or royal decree or by precedent, are sung or played on ceremonial occasions or at public gatherings. Often the two are the same, but quite as often they are not. True national hymns, that is, those expressing the patriotic sentiments of a people, the outgrowth of their history, form an interesting stage in the development of national music. The steps are, first, folk music; second, national music involving folk music; third, music in praise of rulers or institutions; fourth, patriotic music, the *national hymn*.

The following list gives the specified or accepted national hymns of the various important nations:

Austria, *Gott erhalte unsern Kaiser* (God preserve our Emperor). Music by Haydn; words by Haschka.

Brazil, *Hymn of the Proclamation of the Republic*. Words by Albuquerque; music by Miguez.

France, *La Marseillaise*, by de Lisle.

Germany, *Die Wacht am Rhein*, by Schneckenburger.

Great Britain, *God Save the King*, probably by Carey.

Greece, *Sons of Greece, Come, Arise*.

Holland, *William of Nassau*.

Italy, *Air—Royal March*, by Gabetti.

## Hymns and Hymn Tunes

Japan (translated), *May the Empire Last*.

Mexico, *Mexicans at the Cry of War*, by Nuno.

Norway, *Song for Norway*, by Björnson.

Russia, *God Protect the Czar*. Words by Zhukovsky; music by Lyoff.

Spain, *Himn de Riego*. Music by Herta.

Sweden, *Out of the Swedish Heart*.

United States, *Star Spangled Banner* and *Hail Columbia*.

The following are popular hymns widely used upon patriotic occasions in the countries named:

United States, *Yankee Doodle*, *Dixie*, *America* or *My Country 'Tis of Thee*, *Battle Hymn of the Republic* and *Columbia, the Gem of the Ocean*.

Germany, *Heil dir im Siegerkranz* (Prussia): *Deutschland über alles*.

Canada, *The Maple Leaf*.

See AMERICA; GOD SAVE THE KING; MARSEILLAISE HYMN; STAR SPANGLED BANNER; WACHT AM RHEIN; YANKEE DOODLE.

**Hymns and Hymn Tunes**. A hymn is, in its more general sense, any religious poem, but in its narrower and more common sense it is a religious poem intended to be sung. From the earliest times hymns were used in worship, and the Hebrew *Psalms* constitute a collection of hymns which has never been equaled. In the Christian church there are records that hymns were used as early as the second century A. D., but the first which has come down to us dates from the beginning of the third century. A number of the world's most famous hymns are of Latin origin, but of some of them the authorship cannot be decided. Among these are *Come, Holy Spirit*; *Dies Irae* and the *Stabat Mater* (The Mother Stood).

The Reformation gave a great impulse to the writing of sacred songs, and Luther had a permanent influence on hymn writing, in that he introduced the use of the language of everyday life for hymns. Some of Luther's hymns remain among the best-known hymns of the church, especially *Ein' feste Burg ist unser Gott* (A Mighty Fortress is Our God). Although many hymns were produced in England before the time of Isaac Watts (1674–1748), the name of the "father of English hymnody" is often given to Watts. His hymns are very numerous, and many of them are still exceedingly popular. The only possible rival to Watts in the number of his compositions was Charles Wesley (1707–1788), who wrote over six thousand hymns, almost four hundred of which are still commonly used. Among the later hymn writers in England may be mentioned Cowper, John Henry Newman



## Hypatia

and Frances Ridley Havergal; while of American writers may be mentioned Oliver Wendell Holmes, Phoebe Cary, P. P. Bliss, Julia Ward Howe, who wrote the *Battle Hymn of the Republic*; Samuel Francis Smith, author of *America*; Timothy Dwight; Ray Palmer, who wrote *My Faith Looks Up to Thee*, and Frances Jane Crosby, the author of a great number of gospel hymns, of which perhaps the most famous are *Safe in the Arms of Jesus*; *Pass Me Not, O Gentle Savior*, and *Jesus is Calling*. Several hymns which are among the most noteworthy in common use in the churches are *Lead, Kindly Light*, by John Henry Newman; *Nearer, My God, to Thee*, by Mrs. Sarah Flower Adams; *Just as I Am, Without One Plea*, by Charlotte Elliot; *One Sweetly Solemn Thought*, by Phoebe Cary, and *I Love to Steal a While Away*, by Mrs. Phoebe H. Brown.

Previous to the Reformation, the music in use for hymns had been of the nature of chants, or had been heavy and somewhat somber. Luther, however, who had much to do with popularizing the words to hymns in common use, exercised a great influence on the music, also, by adapting certain popular airs and writing sacred words for them. In England the history of hymn tunes begins properly with the eighteenth century. With the music written for the hymns of Charles Wesley, hymn tunes reached, perhaps, their highest point. The character of the music of many of the hymns written in late years has been entirely different from that of the earlier hymns, by reason of its more catchy qualities. The productions of Moody and Sankey represent this type of music, the effect of which on church music in general has not been for the best.

**Hypatia**, *hi pa'she ah*, (about 355–415), a famous Greek philosopher, of the Eclectic school, the daughter of Theon, a celebrated astronomer and mathematician of Alexandria. Her father taught her not only all the branches of polite learning, but also geometry, astronomy and, finally, philosophy. She acquired a great reputation in the latter study and succeeded her father as lecturer at Alexandria, where she gathered a large number of students from all parts of the East. She was as virtuous and beautiful as she was learned. But the jealousy and intolerance of Cyril, the bishop of Alexandria, were aroused at the influence exercised by Hypatia; the lower and more ignorant clergy in particular were stirred against her, and at length a number of them, having excited a popular tumult, seized her as she was returning from the

## Hypnotism

schools, dragged her through the streets of Alexandria, stripped her and finally murdered her with circumstances of the greatest barbarity. She is the heroine of Charles Kingsley's *Hypatia*, or *New Foes with an Old Face*.

**Hyperbola**, *hi pur'bo lah*. See CONIC SECTIONS.

**Hype'ron**, in the most ancient mythology of Greece, the god of the sun, afterward identified with Apollo.

**Hy'permetro'pia**, a defect of the eye, caused by a shortening of the diameter extending from front to back, often referred to as flattening of the eyeball. Rays of light entering an eye thus affected are brought to a focus back of the retina, and the person is said to be *far-sighted*. The defect usually increases with age. It is remedied by spectacles having convex lenses. The gradual shortening of this diameter as people grow older necessitates the use of such spectacles in nearly all cases. See EYE; SPECTACLES.

**Hypnotism**, *hip'no tiz'm*, a condition which may be artificially induced, in which the mind and body of one individual may be peculiarly influenced by another, apparently independently of the subject's will. Such phenomena were known from the earliest time, but Franz Mesmer was the first to use hypnotism as a curative agent. From his name the word mesmerism came to be the common term in use until recent times. Modern scientific investigation, while not fully explaining the phenomena, has shown that they are due to peculiar nervous conditions and that it is unnecessary to presuppose any occult force to account for them. Among the means employed to produce the hypnotic condition are touching and stroking with the hands, breathing on the person and fixing the eyes upon him. It may also, it is said, be produced by causing the patient to stare at an object, especially a bright one, placed in such a position as to strain the eye, the effect being completed by a few passes of the hand over the face without touching it. In the condition thus induced, the patient seems to be in a kind of sleep and the limbs will remain in any position in which they may be placed. By stroking the surface of the body the muscles adjacent may be rendered rigid, as in a person suffering from catalepsy. Reason and memory are temporarily suspended, the will is paralyzed, and the subject is irresistibly impelled to act in accordance with suggestions, however absurd. He can be persuaded into any belief, such as that he is some one other than himself, or that he hears or sees, smells or tastes, something which

## Hypodermic Injection

is not present before him. As a curative agent, hypnotism has been successfully employed in certain forms of disease, especially in cases of nervous irritation and sleeplessness, diseases that have a nervous origin. The first step toward scientific investigation of hypnotic phenomena was taken by James Braid, an English surgeon, in 1842. To him we owe the term hypnotism. Dr. Heidenhain of Breslau attributes the phenomena to what is known by physiologists as the inhibitory action of the nerves. Such action, he holds, is induced by the process of hypnotizing and has the result of suspending the action of that portion of the brain which is devoted to voluntary movements, thus putting the patient in a condition in which involuntary movements may be induced by impressions made upon the senses. Hypnosis comes, then, not through the power of some person without, but through the action of the subject's own mind. One idea alone is held in mind, and as all the others have been discarded, the subject has nothing with which to compare it and it becomes the ruling power. Not everything concerning hypnotism is understood, but it is certain that no one can be at first forced unwillingly into the hypnotic state, and that only those having considerable mental power can pass into the condition.

**Hypodermic**, *hi'po dur'mik*, **Injec'tion**, a method of introducing medicine beneath the skin and so directly into the blood. The instrument in use is a small glass syringe, fitted with a long, hollow, needle-shaped point of steel. Hypodermic injections are given when the condition of the stomach or other organs renders the use of drugs by the mouth objectionable, or when rapidity of action is desired.

**Hypothesis**, a supposition assumed for the sake of argument. In scientific and philosophical usage it denotes either a probable theory of phenomena not yet fully explained, or a strictly scientific theory which accounts for all the

## Hysteria

known facts of the case, and which only needs the verification of subsequent observations and deductions to become a certainty. Thus, the conjecture of Newton that the force of gravity, as shown on the earth, might extend to the moon, was in its first stage a probable hypothesis; but when it was found to account for all the facts of gravitation it became a scientific theory.

**Hy'rax**, a genus of mammals living in southern Asia and southeastern Africa. All the species are small, resembling the rabbit in size and appearance. The *Cape hyrax* is by the colonists of South Africa called *rock badger* and *rock rabbit*, and the common hyrax is also known by the name *coney*. This animal is very cunning and is hard to capture.

**Hyssop**, *his'sup*, a genus of plants, the common species being a perennial, shrubby plant, rising to the height of two feet. It is a native of Siberia and the mountainous parts of Austria, but it is common in the gardens of the United States. It flowers from June to September. The leaves have an agreeable aromatic odor and a slightly bitter and somewhat warm taste. Hyssop was once esteemed as a medicine, but it has now fallen into disuse. The hyssop of Scripture, the symbol of spiritual purification from sin, is generally identified with the caper.

**Hyste'ria**, a nervous disease, more common among women than men, but affecting both sexes. It is often spoken of slightly, and formerly it was thought to be entirely under the control of the patient, but it is now known to be frequently a disease of very serious nature, although minor hysterical attacks are common and require little attention. Overwork, worry, shock or vicious habits may be the causes, and any form of great excitement may bring on an attack. The removal of the causes which produce the disease, nourishing food, exercise or massage and complete abstention from worry and anxiety will usually effect a cure.





**I**, the ninth letter and third vowel of the English alphabet. In its form it has changed considerably from the Phoenician character from which it is derived, and which resembled a Z. The straightening out was gradual. The two principal sounds represented by it in English are the short sound, as in *pin*, and the long, as in *pine*, the latter being really a diphthong, composed of *ah* and *ee*. The other sounds of *i* are that heard in *first*; that heard in *machine*, which can scarcely be considered a modern English sound, though the most common *i* sound in foreign languages; and the consonant sound heard in many words when it precedes a vowel, as in *bullion*. *I* and *j* were formerly regarded as one character.

**Ibadan**, *e bah'dan*, a town of Western Africa, in Southern Nigeria, about 70 mi. n. of the Bight of Benin. Population in 1911, about 175,000.

**Ibague**, *e bah gay'*, a town of South America, in the Republic of Colombia, capital of the Department of Tolima, 60 mi. w. of Bogota. It is located in a valuable agricultural region and is the center of a considerable mining industry. Population, 16,500.

**Ibarra**, *e bahr'ra*, a town of Ecuador, South America, capital of the Province of Imbabura, at the foot of the volcano of the same name, 30 mi. n. of Quito. Once the town had a population of 16,000, but in 1868 it was almost completely destroyed by an earthquake.

**Ibe'ria**, the name formerly given to the peninsula comprising Spain and Portugal. It is supposed to have been derived from the river Iberus or the present Ebro. The Iberians are probably the most ancient European nation. They form the basis of the population of Italy, Gaul, Spain and Portugal. The Basques are their descendants and still preserve the ancient Iberian language.

The name was also applied to a fertile district in Asia, between the Black and Caspian seas.

**Iberville**, *e bair veel'*, PIERRE LE MOYNE, Sieur d' (1661-1706), a French-Canadian soldier and explorer, born in Montreal. He entered the French navy, but returned to America and commanded several exploring expeditions northward and westward into Canada. He took part in King William's War. In 1699 he sailed from France to the Gulf of Mexico, entered the mouth of the Mississippi and established Biloxi, and later Mobile, being thus the founder of the French province of Louisiana.

**I'bex**, a name of two or three species of wild goats. The horns are flattened and long and



IBEX

have two longitudinal ridges at the sides. The *bouquetin* was once common in the Alps, where it lived high up in the mountains. The *Himalayan ibex* is somewhat larger than the other species and has huge horns. These animals are gregarious and have maintained their numbers in nearly all their native districts. Hunting the Himalayan ibex is a favorite sport, but is extremely dangerous because of the wildness and ruggedness of the country in which it lives.

**I'bis**, a wading bird, related to the storks, with a long, slender bill curved downward. Two or three species are found in the United States. The *scarlet ibis* has red plumage throughout, excepting the tips of the wing feathers, which are black. This bird is found in the West Indies, but sometimes comes into the Southern states. The *white ibis*, with black tips to its wing feathers, is common in the Southern Atlantic

## Ibrahim Pasha

and Gulf states. The *sacred ibis* of Egypt is a larger, heavier and less graceful bird. Because it came north with the rise in the Nile and was



SACRED IBIS

an enemy of lizards and small reptiles, it came to be held in great reverence by the Egyptians, who, after its death, preserved it as a mummy. The sacred ibis is now extremely rare.

**Ibrahim Pasha**, *ib rah heem' pa shah'*, (1789–1848), an Egyptian general, the son of Mehemet Ali. He commanded the forces against the Greeks in 1824 and on May 27, 1832, stormed Acre. In the same year he defeated the Turks at Homs and Konieh, and again in 1839 he won a great victory over them at Nisib. In 1848 he succeeded Mehemet Ali as viceroy.

**Ib'sen**, HENRIK (1828–1906), a Norwegian dramatist and lyric poet. His first play, *Catiline*, was published in 1850, and in the same year *The Warrior's Mound* was successfully produced in Christiania. He was successively director of the theater at Bergen and the Norske Theater at Christiania, which he managed from 1857 to 1862. In 1864 he left his native country, lived for several years in Rome and afterwards in Dresden, but went back to Norway in 1878. His dramas are partly in prose, partly in verse, and they include historical plays and satirical comedies of modern life. Among his chief works are *Brand* and *Peer Gynt*, dramatic poems, *The League of Youth*, *A Doll's House*, *Ghosts*, *Rosmersholm*, *The Lady from the Sea*, *Hedda Gabler*, *Master Builder*, *Solness*, *John Gabriel Borkman* and

## Ice

*When We Dead Awaken*. The vital character of Ibsen's themes, the fearless presentation of them and his wonderful mastery of dialogue made him the foremost of modern dramatists.

**Ib'ycus**, a Greek lyric poet of the sixth century B. C. It is related that while on a journey he was surprised and murdered by robbers near Corinth. Finding escape impossible, he declared that the cranes, which happened to be flying over their heads, would avenge his death. When the murderers afterward saw a flock of cranes, one of them cried involuntarily, "Behold the avengers of Ibycus." They were in consequence seized, and, after confessing their crime, they were executed. The writings of Ibycus are known only by fragments.

**Ice**, *ise*, water frozen into a solid mass. Water freezes when its temperature is reduced below a certain point, which is by universal consent made a fixed point on thermometers. In the Centigrade and Réaumur scales this point is zero, and in the Fahrenheit scale it is 32° above zero (See THERMOMETER). As water approaches the freezing point in temperature, it contracts, until at about 39° F. it reaches its greatest density. As the temperature lowers it begins to expand, and when it freezes it



HENRIK IBSEN

expands so as to increase its volume about one-ninth. This makes ice lighter than water, so that it floats. The force of the expansion is



very great. This is why pipes, pitchers and other vessels in which water freezes are broken. The breaking of rocks from cliffs is often due to the freezing of water in crevices of rock. A cake of pure ice appears transparent, but when a thin slab of ice is held in water for a few moments to make the sides smooth and is then looked at towards a light, numerous brilliant six-pointed stars are seen. These are some of the six-sided crystals of which the ice is composed.

**HARVESTING ICE.** The extensive use of ice for preserving perishable substances makes the harvesting, storing and shipping of this article an important industry. Natural ice for use is obtained from the lakes and rivers of cold regions. The first step in harvesting ice consists in scraping off the snow and porous ice from the surface. After this, the field is marked off by a machine called the *marker*. This is drawn by a horse and cuts parallel grooves in the ice about three feet apart; then another set at right angles to the first and about the same distance apart. This marks off the field into cakes. The third step is cutting, which is done by a machine which follows the marker and is of similar construction, except that it has longer knives. After this machine has completed its work, the first cake is cut out by a handsaw. When this has been removed, the others can be split off with a crowbar having a wedge-shaped end. The ice is then hauled from the water to the ice houses, where it is stored until needed. The hauling is done by horses and the placing in ice houses is usually accomplished by means of hoisting engines.

Ice houses are built of wood and in some localities are from two to three hundred feet long and five stories high. They usually have three or four walls, between which spaces of dead air are enclosed, and are provided with drains and ventilators. The ice is packed in sawdust or spent tan bark. The most extensive ice harvesting is on the Hudson River, in Maine and on the lakes and streams of Wisconsin, Michigan and Minnesota.

**MANUFACTURE OF ICE.** In large cities and in localities far removed from regions where ice forms in winter, it is often cheaper to manufacture ice than to import it. When the ice is intended for domestic purposes it is made from distilled water. The plant for the purpose must contain an engine, pumps, condensers, tanks, pipes and some other machinery. The freezing is done by the expansion of liquid

ammonia into ammonia gas, which takes place in coils of pipe that are surrounded by brine. Since the brine freezes at a much lower temperature than fresh water, by immersing the tanks containing the water to be frozen in brine, the ice is readily formed. The water to be frozen is placed in tanks called *cans*. These are shaped like cakes of natural ice. When these tanks are placed in position the pump forces the ammonia gas into a small chamber under such pressure that it becomes a liquid. This liquid in turn is allowed to escape slowly into the pipes, where it immediately evaporates and absorbs heat from the brine, which is reduced to a temperature several degrees below the freezing point of water. The ammonia is used over and over, so that when the plant has been established the expense of manufacturing ice is comparatively little.

**Icebergs**, *ise'burgz*, large masses of ice which have become detached from the shores of the Arctic regions, and which float about in the ocean at the mercy of the winds and currents. They are, in fact, pieces of glaciers, detached from the parent mass by the action of the sea and by their own accumulating weight. Icebergs present the strangest and most picturesque forms, are sometimes miles in length and rise to a height of perhaps two hundred fifty or three hundred feet above the sea, the portion above water being calculated as about one-eighth of the whole. Icebergs consist of clear, compact, solid ice, with a bluish-green tint. Their cavities contain fresh water, from the melting of the ice. They are frequently encountered in the North Atlantic and have caused many wrecks. The ice that forms on the surface of the sea, called *field ice*, is porous, incompact and imperfectly transparent. The field ice forms in winter and breaks up in summer. A small field is called a *floe*; one much broken up forms a *pack*. Floes and packs are encountered by navigators in the Arctic Ocean, and icebergs similar to those of the North Atlantic are found in the south polar regions.

**Ice Boating.** See ICE YACHTING.

**Iceland**, *ise'land*, an island belonging to Denmark, situated between the North Atlantic and the Arctic Oceans, 250 mi. from Greenland and about 600 mi. w. of Norway. Its greatest length is 300 miles; its central breadth is about 200 miles, and its area, 40,000 square miles. Among the volcanoes the most celebrated is Mount Hecla, in the south, about 5000 feet high.

## Iceland

Numerous hot springs, or *geysers*, are scattered throughout the island, but are found more especially in the southwest, to the northeast of Reykjavik, the capital. There are numerous lakes and rivers. The most valuable mineral product is sulphur, of which the supply appears to be inexhaustible; the other minerals deserving of notice are chalcedonies, rock crystals and the well-known double refracting spar, for which the island has long been famous (See ICELAND SPAR). Vegetation is confined within narrow limits. Almost the only tree is the birch, which has a very stunted growth, the loftiest trees hardly exceeding ten feet. There are various flowering plants, among which saxifrages, sedums and thrift, or sea pink, are common. Among many varieties of mosses and lichens is the edible Iceland moss. But by far the most valuable crop is grass, on which considerable numbers of live stock are fed. The reindeer, though not introduced before 1770, has multiplied greatly and there are large herds in the interior, but they are of little importance economically. Wild fowl, including the eider duck, whose down forms an important article of commerce, are abundant. The streams are well supplied with salmon, and on the coasts valuable fisheries of cod and herring are carried on. Manufactures are entirely domestic and consist chiefly of coarse woolens, mittens and stockings.

Iceland has a constitution and administration of its own, dating from 1874. There is an Althing, or parliament, which meets twice a year at Reykjavik. It consists of 36 members, of whom 30 are chosen by popular suffrage and 6 are nominated by the king. A minister for Iceland, nominated by the king, is at the head of the administration, but the highest local authority is vested in the governor.

Iceland was discovered by the Norwegians about 860, and in the course of sixty years all the habitable parts of the coast were settled. A permanent government was established, in the form of a sort of aristocratic republic, which lasted for several centuries. Christianity was introduced in 981 and was adopted by law in 1000; and schools and two bishoprics, those of Holar and Skalholt, were established. Previous to this time the Icelanders had discovered Greenland (983) and part of America (about 1000); and they were now led to engage in voyages and travels to Europe and the East. Politically and ecclesiastically the most flourishing period of Iceland—the period, too, when its inter-

## Ice Yachting

course with the world abroad was most active—was from the middle of the twelfth to the beginning of the thirteenth century. In 1264 Magnus VI of Norway united Iceland with his own kingdom, with which it passed to Denmark in 1380, remaining with the latter in 1814, when Norway was joined to Sweden.

The Icelandic language is the oldest of the Scandinavian group of tongues, and as it is believed to exhibit the Norse language nearly as it was spoken at the date of the colonization of Iceland, it is sometimes called *Old Norse*. Iceland possesses a rich literature. Poetry was early cultivated, and among the most important works in Icelandic literature is the collection of ancient heathen songs, called the *Elder*, or *Poetic Edda*. Histories and romantic works, known by the name of *Sagas*, are numerous. Many of these are masterpieces of prose style and are still read with delight by the people of Iceland. Many of the most valuable foreign works have been translated into Icelandic. Population in 1911, 85,188.

**Iceland Moss**, a species of lichen found in the Arctic regions and on the upper parts of lofty mountains, as, for instance, in Scotland. It is used in medicine, and in Iceland it is an article of diet. When boiled with milk or water it forms a jelly.



ICELAND MOSS

**Iceland Spar**, the transparent variety of calc spar, a mineral noted for its property of exhibiting in a remarkable degree the double refraction of light. An object seen through it appears double. See POLARIZATION OF LIGHT.

**Ice Plant**, so named from the transparent vesicles which cover its whole surface and have the appearance of granules of ice. It is a native of South Africa and the Canaries and is also found in Greece.

**Ice Yachting**, *yacht'ing*, a sport almost peculiar to America, though it is occasionally indulged in near Saint Petersburg in Russia. It first made its appearance in the United States late in the eighteenth century and since that time has steadily increased in popularity, until now it is commonly seen on lakes in the northern states during the winter months. The most



## Ichneumon

common type of ice yacht consists of a triangular box mounted upon two crossbars, the lengthwise bar being from one-third to one-half longer than the crossbar. On both ends of the crossbar are fastened steel skates, and at the rear of the longer bar is a skate which is under the control of a lever and serves as a rudder. The boat has one large sail and often a smaller jib sail. In racing, a triangular course of about one mile on a side is laid out, and the contestants are compelled to sail five times around this triangle in each heat. Under favorable weather conditions and on good ice, remarkable time can be made, since in certain directions the boat can move considerably faster than the wind that propels it. From 40 to 70 miles an hour is not an unusual speed. The principal points at which ice yachting tournaments are held are on the Hudson River, at Poughkeepsie and Newburgh; Lake Minnetonka, near Minneapolis, Minn.; Lake Winnebago, near Oshkosh, Wis.; at Burlington, Vt., on Lake Champlain; on the Saint Lawrence River, and on Lake Ontario.

**Ichneumon**, *ik nu'mon*, a genus of carnivorous animals belonging to the civet family. They have a long, slender body, a sharp and pointed muzzle and short legs. The most celebrated species inhabits Egypt, where it is called *Pharaoh's rat*. It was held sacred by the ancient Egyptians on account of its hostility to crocodiles, whose eggs it digs out of the sand and sucks. It is expert in seizing serpents by the neck so as to avoid any injury to itself. The ichneumon is domesticated in Egypt, and is more useful than a cat in destroying rats and mice. The *Mongoose*, or *Indian Ichneumon*, is another species, not so large as the Egyptian, which it resembles in habits. It is kept in many families as a useful domestic animal. It is especially famous for its ability to kill the deadly cobra.

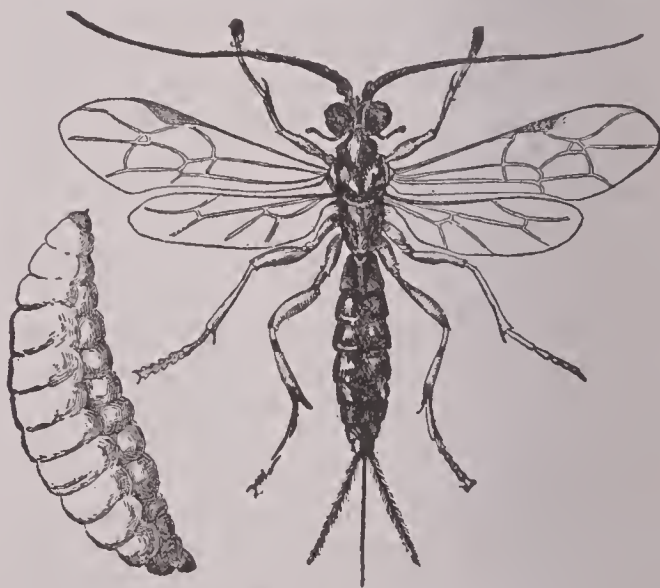
**Ichneumon Flies**, a large family of insects, all of which agree in one particular, that they deposit their eggs either in or on the bodies, eggs or larvae of other insects. These apparently insignificant creatures confer inestimable benefits on man, as they destroy hosts of insects injurious to crops. They are delicate, long-legged insects, varying much in size. They are armed with ovipositors of various forms.

**Ichthyosaurus**, *ik'thy o saw'rus*, an immense fossil marine reptile. The members of this genus had four broad feet, or paddles, each enclosed in a single sheath or integument, and a long

## Ictinus

and powerful tail. Their bodies were round and tapering, the heads large, with long snouts and short necks. The vertebrae of these animals very closely resembled in shape those of a fish. Some of the largest of them must have exceeded thirty feet in length. Their remains show that they existed in large numbers in some parts of Europe. In all about thirty-five species are known, skeletons of which have been found in the formations of the East Indies, Australia, New Zealand, South America and Europe.

**Iconoclasts**, image breakers, the party in the early Christian church that would not tolerate images, much less the adoration of them. At first, images of martyrs and bishops were placed in the churches merely to keep their memory fresh, but latterly (in the sixth century), they began to be worshiped, lights being burned before them and incense offered in their honor. The Eastern emperor Leo III issued an edict in 726, ordering the people to abstain from the worship of such images, and soon after he decreed their destruction. This caused great commotion, and there arose two parties in the church, the image worshipers and the *Iconoclasts*, or image breakers, who



ICHNEUMON FLY AND LARVA  
Much enlarged

each in turn persecuted the other. In the Western Empire, also, images were at first retained only to preserve the memory of pious men, but the decision of the pope, which allowed the worship of images, finally prevailed in the Western Church.

**Icti'nus**, an ancient Greek architect, in the Age of Pericles, chief architect of the Parthenon at Athens and of other important buildings.

**I'da**, in ancient geography: 1. A mountain range in Asia Minor, at the foot of which lay the city of Troy. Its highest peak is Gargarus, 5750 feet. 2. The middle and highest summit of the mountain chain that divides the island of Crete from east to west. This peak affords a fine prospect and is covered with woods of pine, maple and cedar.

**I'daho**, the GEM OF THE MOUNTAINS, one of the Northwestern states, is bounded on the n. by British Columbia, on the e. by Montana and Wyoming, on the s. by Utah and Nevada and on the w. by Washington and Oregon. The northern boundary is 50 miles long, and the southern has a length of about 325 miles. The length from north to south is 480 miles, and the area is 83,888 square miles. of which a little over 500 square miles is water. Population in 1910, 325,594.

**SURFACE AND DRAINAGE.** Idaho is on a plateau which forms a portion of the Great Basin, and has an elevation within the state varying from 2000 to 5000 feet. The state lies between the main axis of the Rocky Mountains on the east and the Cascades on the west. The Rocky Mountains with their extensions northward, the Bitter Root and Coeur d'Alène ranges, form a part of the northern and eastern boundaries. Spurs project westward from these ranges, in some places extending across the state. Among the most important of these spurs are the Salmon River Mountains in the east center, the Sawtooth Range in the west center and the Goose Creek and Bear River ranges in the south. In the northern part of the state are found spurs from the Rocky and Bitter Root ranges, the Cabinet Mountains, the Seven Devils and Clearwater Mountains and the northern slope of the Salmon River Divide. With the exception of a few peaks and ridges none of these exceeds 5000 feet in altitude. Among the spurs in the central part of the state, however, are occasional peaks which attain an altitude of 12,000 feet, and a large number which are crowned with perpetual snow. In the south there are some peaks which have an altitude of 6000 feet, but most of them are lower.

A watershed crosses the state from east to west about halfway between the 44th and 45th parallels of latitude, and separates the basins of the Snake and Salmon rivers. With the exception of a great bend to the southward in the eastern part of Custer County, this divide extends practically east and west. Another watershed in the southeastern part of the state

separates the waters of the Bear River Basin, which is drained into Great Salt Lake, from those of the Snake.

Throughout the state mountains and highlands are interspersed by deep fertile valleys and level plains. Among the most noted plains are the Lost River Plains, Little and Big Camas Prairie and Bear River Valley in the south. The chief agricultural valleys in the south are those of the Snake, the Weiser, the Payette, the Boise, the Little and Big Wood, the Portneuf, the Blackfoot, the Rock Creek, the Salmon, the Bruneau, the Goose Creek and the Long Valley. In the northern part are the Salmon, the Clearwater, the Palouse, the Coeur d'Alène, the Spokane and the Kootenai valleys, the Nez Perce and Camas prairies, the Palouse Country and the St. Joseph and Doumaeq plains. In the south central part of the state is a small basin containing a number of rivers, which, after flowing for distances varying from 40 to 80 miles, disappear in the earth. This region is very appropriately named the Lost River Plains. Near the town of Hagerman, in Lincoln County, there is a cluster of springs known as the Thousand Springs, which discharge a large volume of water into the Snake River. Some geologists advance the theory that in these springs the lost rivers find their outlet. In the northern part of the state are a number of depressions containing lakes. The most important of these are Lake Pend Oreille, Lake Coeur d'Alène and Priest Lake.

A part of the southeastern counties is drained by Bear River into Great Salt Lake. With this exception the entire state is drained into the Columbia River through the Snake, the Clark and their tributaries, and a number of minor streams to the north. The Snake pursues an irregular course across the southern part of the state, thence turns northward and forms about one-half of the boundary between Idaho and Oregon. During its course it receives numerous tributaries from the north, and a few minor ones from the south. The Salmon River waters the central part of the state, and flows in an irregular course northwest and thence north again, until it joins the Snake on the western boundary of the state. The Clark drains Lake Pend Oreille and the northern part of the state. The Clearwater and a number of smaller streams are found between the Clark and the Salmon. Many of the rivers flow through deep canyons which are remarkable for the beauty and grandeur of their scenery. On the Snake River occur the great Shoshone Falls, which exceed those of the



Niagara in height and rival them in grandeur. Other falls in this river worthy of note are the American and the Twin. The Salmon Falls of the Salmon River should also be mentioned. All streams have their sources in the mountains and are fed from deep springs and melting snows. They supply an abundance of pure water suitable for domestic purposes and for irrigation.

**CLIMATE.** The difference in altitude gives the state a diversity of climate so far as temperature is concerned. In the valleys and on the plains the mean temperature is higher than on the uplands of the same regions. In the southern part of the state, during July and August, the temperature may rise to 100°, but in the lowlands the winters are mild, and the temperature seldom falls below freezing point. Here there is but little snow. In the mountains, the winters are more severe and the snowfall is heavy, but the mountain valleys are sufficiently sheltered to allow stock to roam at large during the winter, and in many sections without feeding. In the southern part of the state there is not sufficient rainfall for the production of crops without irrigation, or the practice of what is known as dry farming. In the northern part of the state, however, there is an abundance of rainfall, caused by the contact of the western winds with the mountain regions. For the latitude, the climate here is mild. Throughout the state the climate is temperate, free from extremes and remarkably healthful.

**MINERAL RESOURCES.** The mineral resources of Idaho are varied and extensive, and mining is one of the leading industries. In 1860 gold was discovered on Orfino Creek, in what is now the north central part of the state. The discovery of other deposits soon followed, and within the next ten years over \$250,000,000 worth of gold was taken from placer mines. In some localities placer mining is still carried on under the high pressure system, and on an extensive scale, but most of the gold and silver is obtained from veins, and most of the ore requires an elaborate process of reduction. Mines are worked in the south, central and northern parts of the state. Deposits of gold and silver are very generally distributed, and as railways are constructed, mines will be opened in regions which at present are lacking in transportation facilities. Extensive deposits of copper occur and are being worked along the Snake and Salmon rivers, as are other deposits in the Seven Devils, Iron Dike, Imnaha and Blue Jacket districts in the northern part of the state. Lead occurs in large quantities, and

constitutes the largest source of revenue from mining operations. Coal is found in various localities, and in several places is mined for the local market. Large quantities of phosphate rock occur in Bear Lake County, and are a valuable asset to the locality. The annual output of all mineral products amounts to about \$24,000,000. Of this, lead furnishes about \$12,500,000, silver \$5,500,000, copper \$2,240,000 and gold \$1,375,000. The balance is furnished by numerous other products in smaller quantities.

**AGRICULTURE.** Since 1900 the agricultural development has bordered upon the marvelous. In the northern part of the state there is sufficient rainfall for growing all crops adapted to the climatic conditions of that region. In the southern part two systems are followed: intensive farming upon irrigated land, and extensive farming, in which dry farming is practiced (See DRY FARMING). The husbandman receives ample returns for his labor from each system. Throughout the state, the soil, except on the mountains, is remarkably fertile, and all crops, except oranges and lemons, can be successfully grown. The mild, equable climate and large number of sunny days make this an ideal region for raising fruit, and apples, pears, prunes, apricots, peaches and smaller fruits are grown in large quantities in the valleys and on the plains. Alfalfa, timothy, potatoes, sugar beets and other vegetables, and wheat, oats and other cereals yield large returns to the farmer.

The raising of live stock, especially sheep, cattle and swine, is an important branch of agriculture, and dairying and poultry raising are also profitable. The state contains extensive pasture lands, and stock seldom requires shelter during the winter, conditions which give the stock grower a large profit on his investment. In the average yield of hay, Idaho ranks third among the states of the Union, and she is fourth in the total production of wool.

**MANUFACTURES.** As in other new states, the manufactures are less important than mining and agriculture, but they are making rapid progress. The state contains over 20,000,000 acres of white pine and other valuable timber trees, and the central counties are considered to have the largest virgin white pine forests in the world. Much of this timber is yet beyond reach; nevertheless, there are sufficient forest areas along streams and near railroads to make lumbering the leading manufacturing industry of the state. The manufacture of flour and other grist-mill products is also important.

**TRANSPORTATION AND COMMERCE.** The streams are so rapid that they cannot be successfully navigated; besides, many of them contain falls at frequent intervals. The southern part of the state is crossed by the Union Pacific and the Oregon Short Line, the northern part by the Great Northern Railway; the Northern Pacific extends across the state from Wallace to Harrison, on Lake Coeur d'Alène, passing through Washington, and the Milwaukee, Saint Paul and Puget Sound crosses Shoshone and Kootenai counties. There are a few spurs extending from these trunk lines to various localities. The Pacific and Idaho Northern Railroad extends northward from Weiser. Good carriage roads and stage lines supply all settlements off lines of railway with mail at regular intervals.

The commerce of the state consists in the exportation of gold, silver, lead and other mineral products, lumber, wool, beef and hides; the imports are largely manufactured products and such foodstuffs as are not grown with profit.

**GOVERNMENT.** The legislative department consists of a senate and a house of representatives. Members of each are chosen at a general election for two years, and the legislature meets biennially. The executive department consists of the governor, a lieutenant-governor, a secretary of state, a state auditor, a state treasurer, an attorney-general and a superintendent of public instruction, each elected for a term of two years by popular vote. The judicial department consists of a state supreme court, district courts, probate courts and justice courts. The supreme court has three judges, who are elected by the people for a term of six years. The state is divided into six judicial districts for the administration of justice through the district courts, and each of these is presided over by a district judge.

**EDUCATION.** The public schools are under charge of a superintendent of public instruction and the schools of each county are under the immediate charge of a county superintendent. Each of these officials is elected by popular vote. The support of the schools is derived from the income from a state fund; from the school fund, obtained from the sale of the sixteenth and thirty-sixth sections of land in each township, and from local taxation. The state university at Moscow is at the head of the public school system. There are state normal schools at Lewiston and Albion. The Idaho Industrial Institute is at Weiser. There are also a number of colleges and secondary schools supported by various religious denominations.

**INSTITUTIONS.** The state penal institutions consist of the penitentiary, located at Boise, and the industrial and reform school, at Saint Anthony, which is designed for juvenile offenders of both sexes. The charitable institutions comprise the hospitals for the insane at Blackfoot and Orofino, and a school for the deaf and dumb.

**CITIES.** The important cities are Boise, the capital; Pocatello, Moscow, Lewiston and Wallace, each of which is described under its title. Other cities worthy of mention are Coeur d'Alene, Idaho Falls, Nampa and Twin Falls.

**HISTORY.** The first white men to visit Idaho were Lewis and Clark, who made explorations there in 1805-1806. Not until 1852, when gold was discovered, did actual settlers come. Ten years later a territory was organized which included Idaho and most of Wyoming and Montana. In 1870 the agricultural development of the state began, and from that time the state has steadily increased in wealth and population. For a few years the settlers suffered more or less annoyance from the Indians, but they were finally induced to part with most of their land and retire upon reservations. By 1875 Idaho was reduced almost to its present boundaries. It was admitted into the Union in 1890, and in 1896 granted suffrage to women.

**Idaho, UNIVERSITY OF,** a state university, established in Moscow in 1892. It is supported by the state, and tuition is free to all except non-residents. The government is in the hands of a board of regents. The courses offered are classical, collegiate, scientific, civil and mining engineering, and agriculture. The number of students is about 750, and the library contains over 27,000 volumes.

**Idealism, i dee'aliz'm,** in philosophy, a theory, that sensible or material objects do not exist outside of consciousness. Idealism makes the spiritual part of man the original and only true existence. See **REALISM**.

**Ides, idez,** with the Romans, the fifteenth day of March, May, July and October and the thirteenth of other months.

**Id'iom,** the name given to certain words or phrases which, though in common usage in a language, do not admit of grammatical analysis. The same term is often applied to the various dialects or forms of a language.

**Id'iot,** a person who, from original defect, is almost destitute of intelligence, or in whom the intellect seems to be almost wholly wanting. The majority of idiots are of small stature and of weak constitution.



## Idol

The causes of idiocy are not well known. See FEEBLE-MINDED, EDUCATION OF.

**I'dol**, an image of a deity, used as an object of worship, such worship constituting idolatry. The early nations "bowed down to idols of wood and stone," and even the Jews under the influence of Babylon made for themselves graven images to such an extent that their prophets had to protest against all forms of idolatry, though there were images of the cherubim in the Holy of Holies. Christianity helped to do away with such expressions of reverence, and the Koran forbade the making of an image of any living thing, whether it was intended to be worshipped or not. Zoroaster did not believe in or recommend idols. Images were introduced by the early Church, as is shown in the cups used in administering the Lord's Supper. The chapels in the catacombs contain on their walls many representations of sacred things. In the fifth century, statues of Christ, of the Virgin Mary and of many of the saints were used in both public and private worship. Today, images serve as incentives to devotion, rather than as objects of worship, but they are unknown in any of the wholly Protestant communions.

**Idol'atry**, the worship of an image, object or symbol, as having in itself some divine and supernatural power and being able in some way to respond to the worship paid it. Idols consist of images, usually representing some deity or person, but idolatry may also consist in the worship of natural objects to which divine powers are ascribed, such as the sun and animals. Some consider idolatry to be a falling away from the worship of the true God and see in the various forms of heathen worship only a degraded form of original revelation. Others believe that idolatry is the result of an inborn desire to search after the true God and consider it the first stage of human development along religious lines. There are many forms of idolatry, and it characterizes some of the great religions of the world. See BUDDHISM; BRAHMANISM.

**Idun, e'doon**, a goddess in the Scandinavian mythology, the wife of Bragi and the keeper of the apples of which the gods ate to keep themselves young.

**I'dyl**, (from the Greek word meaning *little image*), the name usually applied to a short and highly finished descriptive poem, especially one which treats of pastoral subjects. This last circumstance, however, is not an essential characteristic of the idyl. All that is necessary

## Iguana

to constitute a poem of this class is that it present to view a complete picture in small compass.

**Ignatieff, ig nah'tyef**, NIKOLAI PAVLOVITCH (1832-1908), a Russian soldier and diplomatist. He served in the Crimean War and was made a colonel in 1856. In 1858 he was sent on a special mission to Bokhara and Khiva and afterward went as ambassador to Peking. He was appointed minister at Constantinople in 1864, and he remained in Turkey through the troublous times prior to the Russo-Turkish War. The intrigues to which he resorted for advancing Russian influence in Turkey and weakening the Turkish Empire won for him the title of "Liar Pasha." He was conspicuous in the negotiations before and after the Russo-Turkish War and was appointed minister of the interior, but was dismissed in 1882. Subsequently he was made governor general of Irkutsk.

**Ignatius, ig na' she us**, SAINT, bishop of Antioch, one of the apostolic fathers, said to have been a disciple of the apostle John. His life and death are wrapped in fable. According to the most trustworthy tradition, he was appointed bishop of Antioch in 69 A. D. and was thrown to wild beasts in the circus of Antioch by the command of Trajan, the date being given by some as 107, by others as 116 A. D.

**Ignatius of Loyola**. See LOYOLA, IGNATIUS OF.

**Ig'neous Rocks**, in geology, those rocks which were originally formed by the action of heat, having been cooled from a molten condition, such as lava, basalt and granite. Igneous rocks have not stratified and may occur in connection with sedimentary rocks of any age, since they have been forced out of their original position by later upheavals in the earth's surface.

**Ig'nis Fat'uus** (foolish fire), a luminous appearance, seen floating over marshy places at night, and sometimes, it is said, in churchyards. It is probably due to some gaseous mixture, capable of igniting spontaneously, but it has never been satisfactorily explained. Other names are *Will-o'-the-wisp* and *Jack-o'-lantern*.

**Igorrote, e' gor ro' tay**, a tribe or race inhabiting several islands of the Philippines.

**Iguana, ig wah' na**, a genus of lizards, natives of Brazil, Guiana and neighboring localities. The iguana has an average length of about four feet. Its food consists almost entirely of fruits, fungi and other vegetable substances. Along the whole length of the back to the tip of the tail

## Iguanodon

there is a crest of elevated, compressed, pointed scales. The toes are furnished with sharp claws, which enable it to climb trees with ease, while a rapid serpentine movement of its tail propels it swiftly through the water. Its usual color is dark olive green. Its flesh is considered



IGUANA

a delicacy, being very tender and in flavor resembling that of a chicken. One species, the *alligator lizard*, is found in the United States as far north as Indiana. Certain species are valuable to farmers as destroyers of insects and harmful worms.

**Iguanodon**, *ig wahn'o don*, an extinct fossil lizard, found in Europe; so called from the resemblance of its teeth to those of the iguana. The head was large and narrow, and the jaws were heavy, provided with strong, horny beaks like those of the turtle. The teeth were large and broad, implanted in sockets and transversely ridged. The pelvic bones were strikingly like those of birds. The skin does not seem to have possessed the spines or bony plates of allied species. The iguanodon was an herbivorous animal that walked on its hind legs, in the manner of kangaroos. It was from fifteen to twenty-five feet long. Great numbers of the animals were formerly found in the swampy regions of England and Belgium.

**Ik Marvel**, *ike mahr'vel*. See MITCHELL, DONALD GRANT.

**Il'eus** or **Il'iac Passion**, the last stage of the severest form of colic. Acute pain, frequent vomiting and hiccup are the chief symptoms. The suffering is often produced by some mechanical obstruction of the bowels, which only a surgical operation can remove. The disease is often fatal.

**Il'iad**, the greatest of ancient epics, ascribed to the Greek poet Homer. It is in twenty-four books and describes the events of about forty days in the ten years' siege of Troy by the Greeks. In order to understand the Iliad, the facts leading

## Ilion

up to it, some of which are mentioned in the poem, must be known. The Trojan Paris had carried off Helen, wife of Menelaus, king of Sparta, and the most beautiful woman in Greece. She had been promised to him by the goddess Venus as a reward for his having decided in favor of Venus the contest of beauty between Venus, Minerva and Juno. To recover Helen and avenge the wrong, the Greeks, under command of Agamemnon, king of Mycenae and brother of Menelaus, had set sail to besiege Troy. Ten years they besieged the city without result, for the Trojans would not venture forth to combat, on account of their dread of the famous hero Achilles. Finally, Achilles suffered insult from Agamemnon, who took from him the captive maiden, Briseis, who had been assigned to him after the sack of a small outlying town. Achilles left the conflict and withdrew to his tent by the seashore. This is the point at which the *Iliad* begins, and much of the poem is devoted to the wrath of Achilles, its causes, effects and the manner in which it was appeased. The Trojans, secure in the absence of Achilles, came forth to meet the Greeks, and fifteen of the twenty-four books tell the varying fortunes of the conflict. Finally, Patroclus, the friend and kinsman of Achilles, begs Achilles to lend him his armor, and with it he goes into battle. The Trojans believe they see Achilles and flee in terror, but at length Patroclus is afflicted with a stupor by Apollo and is slain by Hector. To avenge his friend, Achilles returns to the combat, with a new suit of armor given him by Vulcan. He slays Hector and drags his body to the ships. In the last book King Priam begs of Achilles his son's body, and during a truce Hector is buried with fitting rites. The struggle is participated in by the gods throughout the poem, Mars and Apollo aiding the Trojans, Juno, Minerva and the other deities sustaining the Greeks. Several famous single combats occur, as between Paris and Menelaus, Hector and Ajax, Aeneas and Achilles. See HOMER and the names of the principal persons mentioned above.

**Il'ion**. See TROY.

**Ilion**, N. Y., a village in Herkimer co., 12 mi. s. e. of Utica, on the Mohawk River and the Erie Canal and on the New York Central and the West Shore railroads. It is in an agricultural region and has manufactories of firearms, typewriters, bicycles, knit goods, filing cases and other articles. The place was settled about 1816 and was incorporated in 1852. Population in 1910, 6588.



**Ilium.** See TROY.

**Illimani,** *el'ye mah'ne*, one of the loftiest peaks in the Bolivian Andes, fully 21,000 feet high. It is covered with glaciers. On it is Lake Illimani, about 16,000 feet above sea level.

**Illinois,** *il li noy'* or *il li noiz'*, the PRAIRIE STATE, one of the central states, bounded on the n. by Wisconsin, on the e. by Lake Michigan and Indiana, on the s. e. by Kentucky and on the w. by Missouri and Iowa. An unusual portion of the boundary is formed by rivers. The southern half of the eastern boundary is formed by the Wabash, whose meandering course gives that part of the state a very irregular outline. The Ohio washes the southern border and the entire western border is formed by the Mississippi. The greatest length of the state from north to south is 385 miles, the greatest breadth is 218 miles and the area is 56,665 square miles, of which 622 square miles are water. Population in 1910, 5,638,591, making Illinois the third state in the Union in the number of its inhabitants.

**SURFACE AND DRAINAGE.** The state lies within the Great Central Plain, and with the exception of Louisiana and Delaware, is the most level state in the Union. It has a mean elevation of 500 feet above the sea. The surface as a whole is a broad plain sloping gradually to the south and southeast. In the northern part of the state the surface is undulating, with occasional bluffs along the streams. In Jo Daviess County, in the extreme northwestern part, these rise to an altitude of more than 800 feet. In the northeastern corner is a small section sloping towards Lake Michigan and belonging to the Saint Lawrence basin. With this exception, the state lies wholly within the Mississippi basin. The central part of the state is level, with the exception of bluffs along the streams. This region is characterized by a deep fertile soil and excellent farms. It is one of the most productive farming regions in the world. The bluffs along the Mississippi, the Rock and the Illinois rivers form picturesque scenery in many localities. Black Hawk's Watch Tower, near Rock Island and Starved Rock on the Illinois near Utica are of special interest because of their historical associations as well as for their beauty. In the southern counties among the Ozarks there are numerous picturesque valleys and charming ravines. A spur of the Ozark Mountains crosses the southern portion of the state from east to west and contains numerous hills having an altitude of from 1200 to 1400 feet above sea

level. These hills, or mountains, as they are locally termed, rise abruptly in their northern slope, but descend to the level of the Ohio more gradually. In consequence of this feature the ten southern counties are more diversified in surface than any other portion of the state. Much of this region is covered with hardwood forests.

The important rivers in the state are the Rock, crossing the northwestern portion; the Fox, draining into the Illinois, and the Desplaines and Kankakee, which unite to form the Illinois, the largest stream within the state. From its formation this river flows westerly and southwesterly until it enters the Mississippi, about 20 miles above the confluence of that stream and the Missouri. The Illinois flows in a deep channel which it has worn, and it is bordered by fairly high bluffs. It is navigable as far as Utica. The principal streams in the central and southern parts of the state are the Sangamon, an important tributary of the Illinois; the Kaskaskia, which flows nearly across the state in a south-southwest direction and joins the Illinois, and the Big Muddy, joining the Mississippi. On the east are the Embarras, the Little Wabash and the Saline, flowing into the Wabash. The streams flowing into the Ohio are unimportant.

In the northeastern corner of the state are Fox and Grass lakes and a few other smaller bodies of water. There are also lakes in Mason, Lawrence, Monroe, Jackson and Massac counties, but they are small and of little importance. Peoria Lake is formed by the expansion of the Illinois River.

**CLIMATE.** The extent from north to south causes considerable difference in the climate of the extreme sections. That of the southern counties averages 11 degrees warmer than that of the northern counties. The entire state is subject to sudden and excessive changes in temperature, but extremes of heat and cold are of short duration. The climate is in most localities healthful. The average annual rainfall is 38 inches. It is heavier in the south than in the north, but the character of the soil in the north more than compensates for the deficiency.

**MINERAL RESOURCES.** The mineral resources of Illinois are of great value and place her among the most important of the mining states. The most valuable mineral is coal. A line drawn from Rock Island through the northern boundary of Grundy County practically separates the coal-bearing from the non-coal-bearing area. Nearly all the state to the south of this line is underlaid with coal measures. The area of the Illinois

coal measures is about 42,000 square miles. From three to five veins are found in all the measures, and these vary in thickness from a few inches to nine feet. The veins lie from 300 to 1200 feet below the surface, though but few mines have been worked beyond a depth of 500 feet. The annual output is over 36,000,000 tons, making Illinois second only to Pennsylvania as a coal producing state. There is quite an extensive deposit of petroleum in Clark and Crawford counties, in the southeastern part of the state. In 1906 the region was producing about 37,000 barrels of crude oil daily, and the annual output is about 30,000,000 barrels. Galena, a lead ore, is mined in the extreme northwestern section of the state. Tile and brick clay of excellent quality occur in many localities, and building stone is found in Will, Kane, Cook, Kankakee, Henderson, Hancock, Adams and Union counties.

AGRICULTURE. With but few exceptions the soil of the entire state is remarkably fertile and easily tilled. The broad expanse of prairie and the deep, rich soil, free from stones, make the use of agricultural machinery profitable. The most improved methods of tillage are practiced in the best farming sections, and Illinois is one of the foremost states in the extent and value of her agricultural products. The wide climatic range of the state admits of a great variety of crops. Corn is the leading crop; the annual planting usually exceeds 10,000,000 acres, and the annual production is between 350,000,000 and 400,000,000 bushels, making this the leading state in the Union in the growing of this important crop. Large quantities of oats are raised; then follow wheat, potatoes, barley and rye, though the last two are not as extensively grown as the other cereals. Nearly all sections of the state are adapted to fruit, and in the northern and central portions apples, cherries and pears are raised, while south of the center peaches, plums, strawberries, apples and small fruits are grown in large quantities. This is particularly true of the counties south of the Ozark Mountains, where both soil and climate are admirably adapted to this industry.

The raising of corn and the ease with which hay can be procured, together with the presence of extensive tracts suitable for grazing, make Illinois an ideal state for the raising of live stock, and large numbers of cattle and hogs are fattened for the market each year. In addition to this, horses are raised throughout the state, and an extensive dairy business is conducted in the northern half. That portion of the state within

easy shipping distance of Chicago carries on a thriving dairy industry, in producing milk for the city.

MANUFACTURES. Notwithstanding its adaptability to agriculture, Illinois is the third state in the Union in the extent and importance of its manufactures, being exceeded only by New York and Pennsylvania. The reasons for this position of Illinois as a manufacturing state are the abundance of cheap fuel furnished by her coal deposits and the unusual facilities for transportation afforded by Lake Michigan and the numerous railway lines centering in Chicago. About 70 per cent of the manufactures of the state are produced in and about Chicago. The most important of all these industries is slaughtering and meat packing (See MEAT PACKING). Next in order are the manufacture of agricultural implements, iron and steel products, clothing, malt and distilled liquors, flour and grist mill products and printing and publishing. The great iron and steel mills are located principally at South Chicago and Joliet. The ore manufactured into iron at these mills is brought from the Minnesota and Michigan mines by boat as far as Chicago, and the Joliet mills obtain their portion thence by rail. Besides these cities the important manufacturing centers are Peoria, which has the largest distilleries in the United States; Aurora; Elgin, noted especially for its manufacture of watches; Moline, containing extensive factories for the manufacture of agricultural implements; Jacksonville, Rockford, Dixon, Bloomington and East Saint Louis.

TRANSPORTATION. Illinois contains about 12,000 miles of railway, a larger mileage than any other state. Chicago is the terminus of trunk lines whose mileage exceeds 60,000 miles. Among the important lines crossing the state are the Illinois Central; the Chicago & Alton; the Chicago, Milwaukee & Saint Paul; the Chicago & Northwestern; the Burlington & Quincy; the Atchison, Topeka & Santa Fé and the Chicago, Rock Island & Pacific. A number of important trunk lines from the East also terminate in Chicago. There are also numerous interurban electric lines, one connecting Chicago with Aurora and Elgin, another extending from Evanston to Milwaukee, Wisconsin and a system joining Springfield, East Saint Louis, Decatur and Champaign. The Mississippi and Ohio are navigable along both borders of the state, and steamers can ascend the Illinois to La Salle. The Illinois-Mississippi or Hennepin Canal connects the Illinois River at Hennepin with the



Mississippi at Rock Island, and lines of steamers ply between Chicago and the ports on the Great Lakes and Saint Lawrence as far as Montreal.

**GOVERNMENT.** The legislative department consists of a senate and a house of representatives. The state is divided into 51 senatorial districts, each of which is entitled to one senator and three representatives. The senators are chosen at popular election for a term of four years, but the districts are so classified that the terms of one-half of the senate expire every two years. The members of the house of representatives are chosen for two years, and the statute contains a peculiar provision by which the voter may cast three votes for one representative, one vote for each of three representatives or one and one-half votes for each of two representatives. The executive department consists of the governor, the lieutenant governor, the treasurer, the secretary of state, the auditor, the attorney-general and the superintendent of public instruction, each of whom is chosen at popular election for a term of four years, with the exception of the treasurer, whose term is two years and who is not eligible for reelection. The superintendent of public instruction is elected in the middle of the term for which the governor and other state officers are chosen. At the head of the judicial system is the state supreme court, comprising the judges of the seven judicial districts into which the state is divided, the judges being elected for nine years. The judges of these districts choose one of their number as chief justice. Below the supreme court are appellate courts, circuit courts and county courts, and the larger counties have probate courts. At the bottom of the judicial system are the justice courts, which have jurisdiction over petty cases. The local government is administered through county and township officers.

**EDUCATION.** The state maintains an excellent system of public schools on the district plan, with provision for township high schools in all towns which elect to maintain such institutions. The University of Illinois is at the head of the school system of the state, though it is not officially affiliated with the high schools. The school fund is about \$18,000,000, and the support for schools is derived from interest on this, from fines and forfeitures, from an annual assessment of \$1,000,000 upon the taxable property of the state and by local taxation. The annual expenditure for education is about \$33,000,000 and the number of pupils enrolled is about 1,000,000. State normal schools are maintained at Normal,

Carbondale, DeKalb, Charleston and Macomb. The important universities, not connected with the public school system, are the University of Chicago, and Northwestern University at Evanston and Chicago. Besides these there are numerous smaller colleges and secondary schools, supported by various denominations and widely distributed over the state. Some of the most important of these are the Armour Institute at Chicago, Lake Forest University at Lake Forest, McKendry College at Lebanon, Illinois College at Jacksonville, Wesleyan University at Bloomington, Knox College at Galesburg, Augustana College at Rock Island and Monticello Seminary (for young ladies) at Godfrey.

**INSTITUTIONS.** Schools for the deaf and dumb and blind are maintained at Jacksonville; the institute for feeble-minded is at Lincoln; the state penitentiaries are at Joliet and Chester; the state reformatory is at Pontiac, and the hospitals for the insane are at Jacksonville, Anna, Kankakee, Elgin and Watertown. There is a soldiers' and sailors' home at Quincy and a soldiers' orphans' home at Bloomington; there is also a United States soldiers' home at Danville.

**CITIES.** The important cities are Springfield, the capital; Chicago, Peoria, Quincy, Rockford, East Saint Louis, Joliet, Aurora, Bloomington, Elgin, Decatur, Rock Island, Evanston, Moline and Freeport, each of which is described under its title.

**HISTORY.** Marquette and Joliet were the first white men to visit Illinois, crossing it by way of the Illinois River in 1673. In 1680 La Salle built Fort Crevecœur (the broken heart) near Peoria, and in 1682 Fort Saint Louis was erected on Starved Rock. Settlements sprang up at various points, the first being at Kaskaskia, about 1700. In 1763 the territory came into possession of the English. During the American Revolution, Col. George Rogers Clark captured the British posts on the Mississippi and at Vincennes, Ind., and by the treaty of 1783, Illinois was ceded to the United States and in 1787 became a part of the Northwest Territory. It was organized as a separate territory in 1809, with the capital at Kaskaskia; the famous massacre occurred at Fort Dearborn in 1812, and Illinois was admitted into the Union in 1818. In 1832 the indian troubles culminated in the Black Hawk War, which resulted in the final removal of the indians from the state. The Illinois and Michigan Canal was projected in 1837 and was completed in 1848. Trouble arose

## Illinois

with the Mormons, who had settled at Nauvoo in 1840, and in 1846 they removed to Utah. In 1850 Congress granted lands for the construction of the Illinois Central Railroad, which contributed much to the prosperity of the state. Illinois was the scene of a bitter slavery struggle, but freedom prevailed. The state contributed six regiments of troops to the Mexican War, and nearly 250,000 men to the Union army during the Civil War. The great debates between Douglas and Lincoln, rival candidates for the Senate, occurred in 1858. The chief events since the Civil War are the Chicago fire (1871) the anarchist riot (1886), the World's Columbian Exposition at Chicago (1893) and the riots consequent upon the railroad strike in 1894. Illinois has had three constitutions; the first was adopted in 1818, the second in 1848 and the third in 1870. There have been likewise three capitals, Kaskaskia, Vandalia and Springfield. Since the Civil War the state has been almost uniformly Republican in politics. In 1913 Illinois granted to women the right to vote for all offices not created by the state constitution. This includes presidential electors, all municipal offices except justices of the peace, and some state and county offices. The granting of full suffrage would necessitate a change in the constitution of the state. Consult Mather's *The Making of Illinois*; Mason's *Chapters from Illinois History*.

**Illinois** (men), a group of indian tribes that once occupied the present State of Illinois. La Salle in his explorations met the indians, and he and his followers secured to the French the friendship and assistance of the Illinois. After the War of 1812 these indians caused the United States much trouble, but finally they were subdued, and now only about 200 remain, on a reservation in Oklahoma.

**Illinois**, UNIVERSITY OF, a state university, situated at Urbana. It was founded in 1867 and was incorporated as the Illinois Industrial University. In 1885 the name was changed to the University of Illinois. In 1887 it was made co-educational, and about one-sixth of its students now are women. It maintains undergraduate departments in literature and arts, engineering, science and agriculture, and corresponding graduate courses are also given. In addition to the university proper, there is a state library, a school of music, a college of law, a college of medicine, with a department of dentistry and a school of pharmacy. The United States Agricultural Experiment Station is also connected with the uni-

## Illiteracy

versity and is located at Urbana. The medical school and school of pharmacy are located in Chicago. The faculty in all departments numbers about 600, and there are about 5000 students. The library contains 210,000 volumes, and in addition to this, there are several department libraries at the disposal of the university for the purpose of reference. The annual income from all sources is about \$2,300,000.

**Illinois and Michigan Canal**, a boat canal connecting Lake Michigan, at Chicago, with the Illinois River, at LaSalle, Ill. It is ninety-six miles long, sixty feet wide at the bottom and six feet deep, and it has seventeen locks, each one hundred ten feet long and ninety-eight feet wide. It was begun in 1836 and was completed in 1848. By means of this canal, boats can pass from Lake Michigan to the Gulf of Mexico. When first constructed the Illinois and Michigan Canal was an important waterway, but owing to the construction of railways, it is now little used. See CANAL.

**Illinois River**, a river in Illinois, formed by the union of the Kankakee and the Des Plaines, in the northeast part of the state. It flows southwest and falls into the Mississippi about 20 miles above the mouth of the Missouri. It is 500 miles long, half of it being navigable. An expansion in the river forms Peoria Lake. Ottawa and Peoria are on its banks. A canal connects the river with Chicago.

**Illiteracy**, *il lit'ur-a-sy*, as generally understood, the state of being unable to read or write. Frequently, however, as in the United States census reports, the term is applied to those who can read but cannot write. The percentage of illiterates depends upon the educational facilities and regulations within a country, those countries having the smallest percentage which have the most stringent laws regarding compulsory education. The following list includes the most important nations of the world, in the inverse order of the percentage of illiteracy:

PER CENT		PER CENT	
Germany.....	0.02	Ireland.....	17.40
Switzerland.....	0.50	Austria.....	22.60
Scotland.....	1.60	Greece.....	30.00
England.....	1.80	Hungary.....	40.90
Netherlands, The..	2.20	Italy.....	48.20
United States.....	7.70	Spain.....	58.70
Belgium.....	8.50	Russia.....	70.00
France.....	14.10	Portugal.....	73.40

Unfortunately, accurate comparisons are impossible, as some countries include in the list the entire population over ten years of age, some, as Germany and Switzerland, base their



computations on the condition of recruits for the army and navy, and some, as Scotland, take applicants for marriage licenses as the standard. Broadly considered, however, the above figures give a just idea of conditions in the various nations.

**Iloilo**, *e'lo e'lo*, the capital of a province of the same name in the Philippines, situated on the island of Panay, on the southeastern coast. Among the prominent buildings are a cathedral, a seminary and the buildings used by the government. It is second only to Manila in importance as a commercial center and has an excellent harbor. Its chief exports are sugar, tobacco, rice, coffee and dyewoods. Population, 19,054.

**Image Worship**, See IDOLATRY.

**Imaginary Quantity**, in mathematics, in the most general sense, a quantity whose relations can only be expressed, but not determined, by mathematical symbols and processes. The only important example is the indicated square root of a negative quantity, as  $\sqrt{-1}$ . Since the square of both negative and positive real quantities are positive, obviously no negative quantity can have a real square root; but in higher mathematics, expressions for such quantities are constantly produced, and for want of a better name they are called imaginary quantities.

**Imagination**, *im aj'in a'shun*, the power of reproducing mental images in a modified form. Imagination and memory are so intimately associated that some authorities include both under the reproductive powers of the mind. Memory, however, is confined to reproducing images as they occur, while imagination has no such restrictions, and its range is as wide as the powers of the intellect can extend. These powers are sometimes contrasted thus: Memory reproduces images as they were: imagination reproduces them as we wish them to be. The first act in constructing images of the imagination is that of *dissociation*. We cannot recombine the elements of ideas into new images until we first separate them from the ideas in which they originally occurred. One cannot join the human head to the body of a horse until he first dissociates it from the human form.

**PHASES OF THE IMAGINATION.** There are three phases of the imagination, the modifying, the mechanical and the constructive. The *modifying phase* is common to all children and is used in reproducing images in modified form, as seen in the child's ideas of giants and fairies. Because this phase of the imagination is so

active at this period of life, fairy tales are of especial interest to children. The modifying phase, in which objects are enlarged or made smaller, is later followed by the imitative phase, in which the child seeks to reproduce the various actions, tones of voice and other characteristics of those with whom he associates. During this period many of the habits of speech and action which last through life are formed.

*The Mechanical Phase.* In the exercise of this phase of the imagination, parts of objects are joined in such a way as to show no proper relation between them, as in the joining of the head and shoulders of a man to the body of a horse, or the bust of a woman to the tail of a fish. The literature of mythology abounds in illustrations of this sort.

*The Constructive Phase.* This is the most important phase of the imagination, and its activity gives rise to a great variety of products which influence our lives. It differs from the mechanical phase in fitting together the elements which it contains, as in the construction of a machine, which must first be produced in the imagination of the inventor. All the parts are carefully molded and fitted, so that when put together they form a structure which works to a given end. One of the most common uses of this phase of the imagination is in the construction of images from the verbal descriptions of others, as the construction of images of countries and cities which one has never seen, either from listening to a verbal description or from reading. However, in order that correct images may be constructed in this way, it is necessary that the person have in mind the ideas embodied in the description.

Another important use of this phase of the imagination is in the invention and construction of tools, machines and the numerous articles in daily use. It is also employed by every artisan in connection with his work. Every stroke of the blacksmith's hammer, the carpenter's plane or the seamstress's needle is guided by the imagination. It is due to this power of the mind that such wonderful structures as the Brooklyn Bridge, the Eiffel Tower and the great buildings of the Louisiana Purchase Exposition were produced. It is also this phase of the imagination which leads to the construction of the great works of art and literature. In these fields its products are more nearly perfect than in others, because it is not subject to so many limitations of material. The constructive imagination causes us to establish ideals, and because of

## Imagination

this it is an important factor in the building of character. It also has much to do with one's happiness. One is usually cheerful or melancholy, according to the imaginary pictures of the future which he constructs. Worry consists in employing the imagination in picturing magnified evil results of a certain line of conduct or a definite act. In this case the image is much stronger than the reality.

**CULTIVATION OF THE IMAGINATION.** Imagination is one of the most important powers of the mind, but in order that the greatest benefit may be derived from it, careful training is necessary. Those in charge of children can greatly assist in the training of this power by observing the following principles:

(1) The imagination is a practical power and is associated with every act of perception. Without its use a child cannot gain correct ideas of objects. When looking at a ball or a cube, one imagines the shape of the portion of the object which he cannot see.

(2) The imagination has abundant material from which to construct its images. It is impossible to put into the images ideas that are not already in the mind. One cannot imagine an iceberg or a gorilla if he has no idea of these objects.

(3) Fairy tales, myths and fables are particularly suited to young children, because they harmonize so perfectly with the phase of the imagination that is most active during that period of life.

(4) The imitative stage of imagination is strong during the first years of a child's school life and can often be used in such a way as to make the work of the school pleasant and profitable.

(5) The plays of children are actuated by the imagination, and when of the right sort they serve an important purpose in giving strength and culture to this power.

(6) Reading, language, geography and history afford excellent opportunity for giving culture to the constructive phase of the imagination, but in order that the desired results may be obtained, both teachers and parents should see that the subject-matter is thoroughly understood; otherwise, correct images will not be formed.

(7) Within the limits of their capacity, children should be encouraged to exercise the constructive phase of their imagination in invention and creation. They should be led to give as much life as possible to their recitations and

## Immigration

exercises in school and to their work and play at home.

(8) A full development of all the senses is essential to the formation of correct images. This should never be overlooked. See PERCEPTION; SENSATION.

(9) The imagination exerts a strong influence upon the physical condition of young children; consequently, only such subjects should be presented in primary grades as will lead to a happy frame of mind and to the enjoyment of healthful exercise.

(10) The imagination is the power by which ideals are formed. The nature of these ideals will depend upon environment and instruction. Through appeals to the imagination, more than to any other power, children can be led to form right character.

(11) Ideals are progressive, and one gradually leads to another. The wise mother and teacher will see that the ideals presented to children under their charge are constantly and gradually progressing towards higher and nobler types.

See PSYCHOLOGY; MEMORY; FEELING; HABIT. Consult Halleck's *Education of the Central Nervous System* and *Psychology and Psychic Culture*, Sully's *Outlines of Psychology*, Compayre's *Lectures on Pedagogy* and Salisbury's *The Theory of Teaching*.

**Imam**, *c mahm'*, a class of Mohammedan priests. In Turkey they attend to the mosques, call the people to prayer from the minarets and perform other duties. In ecclesiastical affairs they are independent and are not subject to the supreme priest, or mufti. They may quit their office and reënter the lay order. The sultan, as chief of all ecclesiastical affairs, has the title of *imam*.

**Immigra'tion**, the removal of inhabitants from one country or state to another for the purpose of residence, viewed from the standpoint of the country to which they go. The same phenomenon, considered from the standpoint of the country which they leave, is *emigration*. The causes of such removal are as various as human motives and temptations; but among the important ones are over-population, industrial and economic depression, religious or political oppression, the spirit of adventure, the desire for fame and fortune. In barbarous times a tribe, having exhausted the tract on which it had established itself, naturally migrated to more tempting territory. In Greece, the limited territories of the states ren-



## Immortality

dered the occasional deportation of part of the inhabitants to new colonies a necessity; while at Rome, where the land was held by a few proprietors, and the trades and professions were mainly exercised by slaves, the larger part of the free population eventually had to occupy conquered territory in Italy and elsewhere.

Emigration, in its modern sense and extent, commenced with the departure of the Puritans to New England in 1620; the Quakers and Germans colonized Pennsylvania; the Dutch, New York; the Swedes, Delaware; the French, Canada and Louisiana. The current of emigration to America was slow until 1815, when its rapid increase at first occasioned some alarm. It is estimated that prior to 1820 about 250,000 immigrants had come to the United States. In 1820 immigration amounted to 8385; in 1830, to 23,322; in 1840, to 84,066; in 1850, to 369,986; in 1860 it fell to 150,237; in 1870 it again increased to 387,203; in 1880, to 457,257; in 1890 it was 455,302; in 1900, 448,572; in 1905, 1,027,421, and for the year ending June 30, 1910, it was 1,041,570. For the decade 1900 to 1910 the total immigration to the United States amounted to 8,795,386, and since 1824 it has amounted to 30,808,944, a population greater than the combined population of New York, Pennsylvania, Illinois and Ohio, the four most populous states in the Union. These figures do not include the influx from Canada and Mexico.

An interesting comparison has been made recently in regard to the nationality of immigrants. In the decade ending in 1830, 76.5 per cent of the total immigration to the United States was from Great Britain, and but .3 of 1 per cent from Italy, Russia, Poland and Austria-Hungary, combined. In the decade ending in 1900 the percentage was as follows: from Great Britain, 19.4 per cent, from Italy, Russia, Poland and Austria-Hungary, 49.3 per cent; and in 1913 the difference was still more marked, as follows: Great Britain, 7.3 per cent; Italy, Russia, Poland and Austria-Hungary, 67.7 per cent.

Canada, the South American countries and Australia have also received a large immigration, but not equal to that of the United States. There is a growing tendency in all countries to more carefully restrict immigration by requiring rigid health and property tests and, in some cases, educational qualifications.

**Immortality**, exemption from death; the state of everlasting life. The belief in the immortality of the soul is very ancient. It is

## Impeachment

connected with almost all religions, though under an infinite variety of conceptions. By the immortality of the soul is understood the endless continuation of personality, consciousness and will. There are so many reasons to render immortality probable, that with most nations the belief is as clear and firm as the belief in a God; in fact, the two beliefs are intimately connected in the minds of most men. Among rude peoples the life after death is usually regarded as a state of being not essentially different from the present—one in which the hunter shall renew his chase, and his bodily senses shall have their accustomed gratifications. Among the ancient Greeks and Romans the spirits of the dead were believed to live in the other world as a sort of shadows, and the life after death was also considered as a shadow of the present. Among some peoples the imagination attributes changes of condition to the future life, and the doctrine of transmigration, or the progress of the mind or soul in different stages, is developed. Connected with the belief in the immortality of the soul is the belief, existing among the Egyptians and many Christians, in a state where souls are purified after death.

**Immortelle**, *im mor tel'*. a flower which will retain its color and general appearance for an indefinite period. The name is usually given to certain species of Compositae, which are used at funerals and for the decoration of graves, especially in France. These immortelles, or *everlastings*, are woven into wreaths, and sometimes the natural white flowers are stained with different colors and made into brilliant, if not altogether pleasing, designs.

**Impeachment**, a calling to account of a public officer for maladministration. By the Constitution of the United States the procedure of impeachment is as follows: The House of Representatives are the accusers and appoint managers to conduct the prosecution before the Senate. The vote of the Senate is taken by putting the question separately to each member, and a majority of two thirds is required for a conviction. In the separate states it partakes of the same quasi-political character—neither the prosecutors nor the judges being the same as in ordinary criminal offenses. Conviction leads to removal from office and sometimes to disqualification from future political action or benefit. The most noted instances of impeachment in the United States are those of Associate Justice Chase in 1804, of President Andrew Johnson in 1868 and of Governor Sulzer, New York, in 1913.



## Imperator

**Impera'tor**, among the ancient Romans, a term originally applied to a military commander. After the overthrow of the republic, *imperator* became the highest title of the supreme ruler and acquired the signification which we attach to the word *emperor*. It was still given, however, to triumphant generals, and in this case it had its old signification.

**Impe'rialism**, a term applied in modern politics to the policy of a government which establishes wide spheres of influence far from its own shores. The leading exponent of this policy in recent years has been Great Britain. In the United States the acquisition of the Philippines and Porto Rieo aroused the protest of many men, on the grounds that it was a step toward imperialism and was contrary to American precedent. This issue became an important one in the presidential campaign of 1900, in which the so-called "anti-imperialists" played a conspicuous part.

## Inclined Plane

right had been claimed by England for many years prior to 1815, and she had extended this claim to include the right to board and search the vessels of other nations for English seamen. This right was disputed by the United States, who finally declared war for this cause, among others. Though by the treaty England did not disclaim this right, she has never since urged it.

**In'ca**, the name given to one of the ruling class of the Peruvian indians, at the time of the Spanish conquest. The government of the incas was the most stable and the best on the continent, though in some respects they were not so enlightened as the Aztecs and Mayas. The Peruvians were agricultural people, who irrigated their lands and built great granaries and fine roads to all parts of the Empire. Gold was owned by them in abundance and was used in the decoration of the palaces and temple of the incas. The capital of the Empire was at Cuzco, until just before the arrival of Pizarro, when



RUINS OF AN ANCIENT INCA CAPITAL  
Believed to have been built before the time of Christ. Discovered in 1911.

**Impres'sionist School of Painting**, a name given to a group of painters who neglect the details of a subject, in the effort to reproduce the exact impression which the whole body produces upon their minds. The school is also called the Naturalist school. Their chief means of reproducing their impressions are by the effective use of light and shade, while they disregard outlines, as such.

**Impress'ment of Sea'men**, the act and policy of compelling persons to serve in a navy. This

Atahualpa, heir to the throne, moved his capital to Quito, to protect himself from a rebellion started by his brother (See **ATAHUALPA**). It was in 1523 that the Spaniards conquered the country, but it was forty years later before the indians were fully subdued. Some of their descendants, now civilized and respected, are living in Peru. See **PIZARRO, FRANCISCO**.

**Inclined Plane**, a device used for raising heavy weights, as when a barrel of flour is loaded onto a wagon by being rolled over a plank, one end



## Incombustible Cloth

of which rests upon the wagon and the other on the ground. There are many practical applications of the inclined plane, one of the most common being the winding of a road around a hill, so as to avoid steep grades. The law of equilibrium of the inclined plane is that the power multiplied by the length of the plane equals the weight raised multiplied by the height.

## Independence

on incomes between \$1,500,000 and \$2,000,000 (62% on \$500,000). On incomes exceeding \$2,000,000 the rate is 63%. The surtaxes just quoted are in addition to the normal taxes.

The operation of the law can best be shown by a table illustrating how a man with a taxable income of \$100,000 determines the amount he has to pay:

NORMAL TAX			
2%	on amount by which \$4,000 exceeds \$2,000 (2% on \$ 2,000)		\$ 40.00
4%	on amount by which \$100,000 exceeds \$4,000 (4% on \$96,000)		3,840.00
Total normal tax			\$3,880.00
SURTAX			
1%	on amount by which \$7,500 exceeds \$5,000 (1% on \$2,500)		\$ 25.00
2%	on amount by which \$10,000 exceeds \$7,500 (2% on \$2,500)		50.00
3%	on amount by which \$12,500 exceeds \$10,000 (3% on \$2,500)		75.00
4%	on amount by which \$15,000 exceeds \$12,500 (4% on \$2,500)		100.00
5%	on amount by which \$20,000 exceeds \$15,000 (5% on \$5,000)		250.00
8%	on amount by which \$40,000 exceeds \$20,000 (8% on \$20,000)		1,600.00
12%	on amount by which \$60,000 exceeds \$40,000 (12% on \$20,000)		2,400.00
17%	on amount by which \$80,000 exceeds \$60,000 (17% on \$20,000)		3,400.00
22%	on amount by which \$100,000 exceeds \$80,000 (22% on \$20,000)		4,400.00
Total tax			\$16,130.00

**Incombustible Cloth**, cloth which cannot be burned. The fabric is rendered fireproof by steeping in it solutions such as sulphur of ammonia, borax, alum or sal ammoniac. This cloth is used chiefly in making firemen's clothing and curtains and scenery for theaters.

**Income Tax**, a tax levied directly upon incomes of every description, whether derived from land, capital or industry. The income tax forms a prominent feature of the fiscal system of England. The rate is progressive, that is, it increases with the size of the income. An income tax was imposed in the United States as a war measure in 1862, and was repealed in 1871. A subsequent statute in 1895 was declared unconstitutional by the Supreme Court. In 1913, instead of excessive protective tariff duties, the tariff bill provided for a tax on the net incomes of individuals, as authorized by the Sixteenth Amendment.

The entrance of the American republic into the War of the Nations made it imperative to raise vastly more revenue, and an additional law affecting incomes was passed. Under its provisions all unmarried persons whose incomes are over \$1000 are taxed, and all married persons or heads of families whose incomes are over \$2000. The rate is 2% on what is called the *normal* tax until the income exceeds \$4000; above \$4000 the normal tax is 4%. Upon greater incomes, in addition to the normal tax, another tax called a *surtax* is levied. This surtax ranges from 1% on incomes between \$5000 and \$7500 (1% on \$2500), 2% on sums between \$7500 and \$10,000 (2% on \$2500) to 62% surtax

**In'cuba'tor**, in poultry raising, a machine for the artificial hatching of eggs. An incubator consists of a chamber, in which an even temperature can be maintained and in which the eggs are placed. Heat is usually supplied by a lamp, and the chamber may be warmed directly by air or by water which surrounds it. It has an arrangement for ventilation and also for supplying the atmosphere with the necessary amount of moisture.

**Independence, KAN.**, the county-seat of Montgomery co., 85 mi. s. w. of Fort Scott, on the Verdigris River and on the Atchison, Topeka & Santa Fé and the Missouri Pacific railroads. Natural gas and oil wells are numerous near the city, and it has been growing very rapidly, having more than doubled in population in five years. There are cotton, flour, paper, sugar and planing mills, and the manufactures include crackers, glass, vitrified brick and other articles. The city has a considerable trade with the surrounding agricultural region and contains a public library and a fine courthouse. Population in 1900, 4851, and in 1910, 10,480.

**Independence, Mo.**, the county-seat of Jackson co., 10 mi. e. of Kansas City, on the Chicago & Alton, the Missouri Pacific and other railroads. The city is a popular residence suburb of Kansas City. It contains several manufactories and is the seat of the Saint Mary's Academy. The place was settled in 1827 and was chartered as a city in 1889. Some Mormons settled here in 1831, but they removed to Illinois in 1838. During the years 1849 and 1850 Independence was quite a gather-





THE SIGNING OF THE DECLARATION OF INDEPENDENCE





# INDEPENDENCE HALL, PHILADELPHIA

Congress met in the room on the first floor, at the right, during the Revolutionary War.



## Independence Day

ing place for the emigrants to California, and from here two of the great trails led westward. During the Civil War it was the scene of several minor engagements. Population in 1910, 9859.

**Independence Day**, a name given to the legal holiday of July 4 in the United States, the anniversary of the signing of the Declaration of Independence.

**Independence Hall**, a brick building in Chestnut Street, Philadelphia, erected between 1729 and 1734 as a meeting hall. Later it was turned into an office building, but during the Revolutionary War it was the meeting place of the Continental Congress. The Declaration of Independence was signed there, July 4, 1776. The building is now used as a museum of historical relics.

**Index Ex'purgato'rius** is a catalogue of books which Roman Catholics are prohibited from reading. The prohibition is based on the authorship, subject-matter, or both, and is either absolute or partial, the latter lasting till the book is made satisfactory. The works of Calvin, of Luther and of any founder of a heresy are absolutely forbidden. Books of an immoral character, books relating to magic and any book that would tend to weaken the faith of a Catholic are placed in the Index. The latest edition is that of Leo XIII, 1895. The work of condemning is done by the Congregation of the Index, composed of examiners, consultants, cardinals and a prefect, who is always a cardinal. Their action is controlled by the pope.

**In'dia**, a British possession of southern Asia, lying between 8° 5' and 20° 55' north latitude and 62° and 100° east longitude, bounded on the n. by Afghanistan and the Chinese Empire, on the e. by the Chinese Empire, Siam and the Bay of Bengal, on the s. by the Indian Ocean, and on the w. by the Arabian Sea and Persia. Between India and the Chinese Empire on the north are two small independent states, Nepal and Bhutan. The greatest extent from east to west, including Baluchistan, is about 2000 miles, and from north to south, 2000 miles. The area of the British Indian Empire, which includes Baluchistan, Burma and the native states, is 1,766,642 square miles, or about one-half that of the United States, including Alaska. The peninsula has a regular coast line of about 3000 miles, with only two prominent indentations on the western side, the Gulf of Cambay and the Gulf of Cutch; while the Pambam Channel separates the island of Ceylon from the mainland. The term *India* is used in two

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senses. In the first it is applied to the empire of India, which includes the British possessions of South Central Asia. In the second it is restricted to the great peninsula between the Bay of Bengal and the Arabian Sea and the country immediately north of it, extending as far as the Himalaya and Karakorum Mountains, a little beyond the 36th parallel of north latitude. This article treats of India proper. For the remaining countries, see BALUCHISTAN; BURMA.

**SURFACE AND DRAINAGE.** The surface of India is divided into three regions, the mountainous region of the Himalayas in the north; the great plain of the Ganges and Indus, adjoining this region, and the table-land of Deccan, which forms the larger part of the peninsula, with its surrounding lowlands on the coast. The mountainous region contains the loftiest peaks and passes of the Himalayas and descends by long, steep slopes to the Ganges valley (See HIMALAYA). The valley of the Ganges and Brahmaputra is generally broad, low and quite level, the lower part of it being inundated during a portion of the year. The southern slope rises gradually to meet the plateau of Deccan. Between the valley of the Ganges and that of the Indus there is a height of land, which consists of a low swell, extending in an irregular line from the Gulf of Cutch northeastward to the mountains. The table-land of Deccan occupies the space between two coast ranges of mountains, known, respectively, as the Eastern Ghats and the Western Ghats, and is bounded on the north by the Vindhya Mountains. Its altitude varies from 1400 to 3000 feet, and on its surface are found numerous conical peaks, that rise from 1000 to 2000 feet above the table-land. This table-land is divided by the Nerbudda and Kistna rivers into north and south sections. The general slope of the region is toward the east, and most of the surface is covered with a fertile soil.

The great rivers of India are the Indus, with its tributaries, the Sutlej and the Chenab, in the northwest; the Ganges, with its tributary, the Jumna, and the Brahmaputra in the north and east, and the Godavari, the Kistna and the Nerbudda in the central and southern part of the peninsula. Of these, only the Indus empties into the Arabian Sea.

**CLIMATE.** The climate of India has a wide range, owing to the extent of latitude and the various elevations of the different portions of the country. In the south and central portions and along the coast the temperature is high throughout the year, but in the elevated regions



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in the interior, as the highest portions of the Deccan, and especially among the mountains in the north, the climate is salubrious, so that these regions afford relief to Europeans and others, who dwell in the lowlands during the cooler season and retire to the mountains for the hot period. The rainfall is extremely varied. To the north, along the Bay of Bengal, in the province of Assam, it is from 500 to 600 inches a year, and in extraordinary seasons it has been known to exceed this amount. This region receives the heaviest rainfall in the world. In the extreme northwestern portion of the country the rainfall is light, and there is a region, extending northward from the Gulf of Cutch for nearly 500 miles, in which rain scarcely ever falls. The annual precipitation at Calcutta is about 66 inches, at Bombay, 75 inches, and at Madras, 52 inches. The arid regions, in which famine is frequent, are in the upper regions of Bengal provinces, in the north central portion of the country.

**MINERAL RESOURCES.** Explorations show that there are extensive deposits of coal, also considerable copper, iron and lead in India proper. Small quantities of silver and gold ore have been found in some sections, and there are some precious stones. The diamond, which was formerly obtained in India in considerable quantities, is now seldom found. Coal is the only mineral extensively mined, and it is produced for the purpose of supplying the railways. Other mining interests have not been developed.

**AGRICULTURE.** The country has a great variety of vegetation. The slopes of the Himalayas below the tree line are covered with timber, valuable for many purposes. The lowlands, especially around the mouths of the great rivers, contain extensive swamps filled with rank vegetation and harboring many fierce wild animals. Trees of various species are scattered throughout the country, though, except on the mountain sides, there are no extensive forests. The most useful trees are blackwood, sandal, teak, various kinds of cedar and some species of palm and oak. Bamboo is also a valuable product.

Agriculture is the leading occupation of the country and engages the attention of a large part of the inhabitants. The people who till the land live in villages, which may consist of a few houses or of several thousand inhabitants. The land is near the village, and each occupant tills a comparatively small area. The native inhabitants are opposed to the introduction of agricultural machinery and of implements such as

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are used in Europe and the United States; consequently, the methods employed are primitive and the results are far less than they might be with better methods of tillage. Nevertheless, the soil is fertile, and where supplied with sufficient moisture it yields good crops. In some sections of the interior irrigation is regularly practiced, and in others it is used when the rainfall is less than the average. The government has, at the expense of large sums, constructed reservoirs in these localities, for the purpose of reserving the surplus of water to be used as needed. The most important crops are rice, wheat and other cereals, cotton, sugar, indigo, opium, jute, tobacco and tea. The northwest provinces raise the largest quantity of wheat, and cotton is grown most extensively in the central portion of the peninsula, while sugar cane is most extensively cultivated in Bengal and the United Province. Indigo is an important product in the lowlands of Bengal, tea is cultivated in Assam and Lower Bengal and opium is restricted to the region around Benares and is a government monopoly. Oil seeds also constitute an important crop in several localities.

**MANUFACTURES.** Ever since India has been known to civilization, the native inhabitants have been famed for their skill in the manufacture of textile fabrics remarkable for their fineness and delicacy. Many of these are made wholly by hand labor and with the simplest of implements. Among them are the products of the Province of Kashmir. Rugs and carpets peculiar to this country are also produced in large numbers. Within recent years, however, modern machinery and factories have been introduced for the manufacture of cotton goods, and this has resulted in the production of large quantities of a coarse, cheap fabric, which has an extensive sale and forms an important article of export. Other products peculiar to India are furniture and articles of beautifully carved woodwork. There is also some metal work in gold and silver of similar nature. Because of the skill used in their manufacture and their beauty of appearance, all articles of this sort command a high price in European markets. Manufactures of jute and hemp are also important, and the extension of commerce with western countries has increased the outputs of woollens, paper, flour and lumber, while in some localities there are breweries and in others indigo and sugar factories.

**TRANSPORTATION.** The large rivers, the Ganges, the Brahmaputra and the Indus, admit

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of navigation for a good portion of their length, but smaller streams, particularly in the mountainous regions, are too rapid for successful navigation, even by small boats. Since the occupation of the country by the British government, railways have been constructed between all of the important cities and into the districts which are liable to be affected by famine. The government was actuated in this work largely by a desire to relieve the famine-stricken districts, by providing means of transporting supplies whenever they were needed. Numerous cross-lines have also been constructed, so that now India is well supplied with railways, there being about 35,000 miles in operation in December, 1914. Much of this is under control of the government, but some systems are leased to private corporations. Canals connecting some rivers have also been constructed, so that, with the exception of the mountainous regions in the interior, all sections have reasonably good transportation facilities.

**COMMERCE.** The commerce of India is among the most important of all Asiatic countries. The principal exports are cotton, rice, jute, opium, tea, coffee, indigo, raw wool, wheat, oils, silks, chemicals, drugs, textiles and other articles peculiar to the manufactures of the country. The imports consist of foodstuffs, machinery and manufactured articles of great variety, especially those that can be obtained from western markets more conveniently and cheaply than they can be produced in the country. A great part of the trade is with Great Britain. Germany, France, the United States and Egypt are also important countries in the foreign commerce; Japan is the most important of the Asiatic nations in this respect.

**INHABITANTS AND LANGUAGE.** The country is densely populated and includes a variety of nationalities and communities. The original inhabitants were probably a race of dark complexion and short stature. These people were in the distant past conquered by an invading race from the northwest, who were of lighter complexion and fair skin. This invading tribe called themselves *Arya*, and it is from them that the term *Aryan* is obtained. They dispossessed the native inhabitants of their dwellings along the coasts and valleys and drove them into the hills. The Aryans thus became the possessors of the country, and a large part of the population, including about three-fourths, generally known as Hindus, are descendants from this people and are considered the native race, while all others

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are considered foreigners. However, the Aryans by intermarriage with other races have greatly changed in appearance since their invasion, and the descendants of pure Aryan stock are now found only in the upper Ganges valley and on the northwestern coast of the peninsula. Following the Aryan invasion at some distance was another by the Scythians, who have also left their stamp upon the northwestern part of the country, while the northeastern region, the valley of the Brahmaputra, contains a large element from the Mongolian nations to the north and east. There are also a few Jews, some Persians and a small number of Europeans in the country.

India has a great variety of languages. In the northern part of the country the dialects are of the Indo-European branch of languages and are closely allied to the Sanskrit. Most important of these are the Hindi, spoken by about 87,000,000 people, and the Bengali, spoken by about 45,000,000. In the northwest the dialect known as the Punjabi, which is a modern Hindu dialect, prevails, while what is known as Hindustani, the most generally used language, is a modified form of Hindi, which contains Persian, Arabic, Turkish and Dravidian words. From the central part of the peninsula south, languages belonging to an entirely different family are in general use.

The prevailing religions are Brahmanism, which is embraced by the largest portion of the inhabitants, or about 207,000,000; Mohammedanism, numbering about 62,500,000 followers; Buddhism, numbering about 9,500,000, and spirit worship, with about 8,500,000 followers. There are about 3,000,000 Christians and smaller numbers of various other sects. The prevalence of Brahmanism, which is based upon caste, has fastened its social system upon the country so strongly that it forms a great barrier to any progress or change in industrial or social organization. See BRAHMANISM.

The government has established schools of higher grade and made provision for elementary instruction in many parts of the country, but owing to the religious objection to education in these schools, only comparatively few children and youth obtain advantages from them. There are universities at Calcutta, Madras, Bombay and other cities, and numerous colleges are scattered throughout the Indian Empire. Missionary societies from America, England and other countries also maintain schools of a high order, in which children of Christian families are educated.



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**GOVERNMENT.** In government, India is a Crown colony (See GREAT BRITAIN, subhead *Government*, division *Colonies*). The officer at the head of the government is the secretary of state for India, who is a member of the British cabinet and is assisted by a council. The executive officer of the government is the governor-general, usually styled the viceroy, who is appointed by the Crown for a term of six years, and who has his residence in Calcutta. He is assisted by a council, which by the addition of members may be enlarged into a legislative body. In the addition of members for legislative purposes, a portion of the council must consist of natives of the country. The presidencies of Madras and Bombay are governed by a governor appointed by the Crown, but the other political divisions are administered by a lieutenant governor or high commissioner, who is appointed by the governor-general. With the exception of important questions pertaining to foreign affairs, the governor-general is free to use his judgment in the administration of the Empire. Local government varies according to conditions. India contains many native states which are ruled by their native rulers subject to the sanction of the governor-general, and some of them are required to maintain a military force which can be called into the service of the Empire any time it is desired. Local government is almost entirely in the hands of the natives, who choose the officers for stated periods. The object of the home government is to place the responsibility for the maintenance of local authority in the hands of the inhabitants, as far as possible.

**CITIES.** India is a country of rural population, and notwithstanding its large number of inhabitants, the number of great cities is comparatively small. Of these the most important are Delhi, the capital; Madras and Bombay, the great commercial ports; Calcutta, Benares, Hyderabad, Lucknow, Rangoon and Lahore, each of which is described under its title.

**HISTORY.** The early history of India is obscurely written in the myths of Sanskrit literature. The first fact of any certainty is that about the year 2000 B. C., or even earlier, an Aryan people of comparatively high civilization descended from the mountain regions of the northwest into the plains of India and subdued the original inhabitants there. The expedition of Alexander the Great to the Indus gives a momentary glimpse of that part of India, but between his invasion and the Mohammedan

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conquest, there is little authentic history. In the third century B. C. Buddhism was established throughout India, but it afterwards gave way almost entirely to Brahmanism. In 1001 A. D. the sultan Mahmud of Ghazni invaded India, and the Mohammedan power was gradually established throughout the country. Late in the fourteenth century Timur, or Tamerlane, led a great Mongol invasion and proclaimed himself emperor of India. He shortly retired, however, to Central Asia, and it was not until 1526 that the Mogul Empire in India was really founded under Sultan Baber, a descendant of Tamerlane. The Mogul Empire began to decline after the death of Aurungzebe in 1707, and about thirty years later Nadir Shah of Persia invaded India and sacked Delhi (See AURUNGZEBE). Throughout the Empire, which had been firmly held together under the great Moguls, the viceroys under the weaker emperors began to declare themselves independent.

The breaking up of this strong Empire offered a good opening to European nations, and the Venetians, Portuguese and Dutch, who had been visiting India from the fifteenth century, began to make their influence strongly felt. The English East India Company had formed commercial settlements in India as early as 1613, and from the first there was a rivalry between them and the French settlements, which had also been established early in the seventeenth century. The first real conflict with the French did not take place, however, until 1746, when the English lost Madras, which was, however, restored to them by the Treaty of Aix-la-Chapelle.

From the time of Clive (See CLIVE, ROBERT), the English held the dominant influence in India, and 1757, the year in which Clive defeated the Moguls at Plassy, is the date of the foundation of the British Empire in India. The strong government set up by Clive was preserved under Warren Hastings, who, by the appointment of English officers to collect the revenues and preside in the courts, laid the foundations of the present system of British administration in India. In 1774 Hastings was made first governor-general of India (See HASTINGS, WARREN). In 1778 the intrigues of the Bombay government led to the first war with the Mahrattas, and in this the British arms were saved from disgrace only by the achievements of the Bengal army which Hastings sent to the aid of the Bombay presidency.

In 1838 the first Afghan War was undertaken,

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the object of which was to set up a native province as a northern guard to British India. The war terminated in disaster for the British, but later in the same year a second campaign was undertaken, which proved more successful. In 1857, shortly after the appointment of Canning to the governor-generalship, the Sepoy Mutiny occurred. Several outbreaks among the Sepoys took place during March, 1857, but the most formidable revolt was at Meerut, on May 10, when the Sepoys rose and massacred the Europeans. They then fled to Delhi, where they were immediately joined by the native garrison, and another massacre took place. The revolt spread rapidly in the northwestern provinces, from Oudh down to Lower Bengal. In the Punjab the prompt measures of the government officials in disarming the Sepoys prevented an outbreak, and the Sikh population continued steadily loyal. Wherever the mutiny broke out, it was attended with savage excesses. At Cawnpore the revolting Sepoys were headed by Nana Sahib, the heir of the last peshwa of the Mahrattas. The Europeans, after a heroic attempt to defend themselves, capitulated on the sworn promise of Nana Sahib that he would allow them to retire unmolested; but as they were embarking, they were set upon and indiscriminately massacred. The women and children were carried back to Cawnpore and kept until July 15, when they were all put to death on the approach of Havelock's army. Havelock took Cawnpore by storm on the following day. At Lucknow Sir Henry Lawrence was besieged in the residency and, despite Lawrence's death, the place was held until Havelock relieved it in September. He himself was in turn besieged and was with difficulty relieved by Sir Colin Campbell (See CAMPBELL, SIR COLIN, Lord Clyde). By May, 1858, order had been partially restored, and the mutiny was at an end.

In 1858, as a result of this mutiny, the sovereignty of India and the powers of government hitherto vested in the East India Company were transferred to the British Crown. The Empire was consolidated by the viceroys who followed, and in 1877 the queen of England was proclaimed empress of India. In the following year occurred an Afghan war with Shere Ali (See SHERE ALI), but peace was finally established, and Abdurrahman Khan was placed on the Afghan throne by British arms. In 1897 another serious outbreak on the Afghan frontier occurred, but the British at length were completely victorious. A severe famine in 1899

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affected millions of people throughout the country, and there were some attempted revolts, but on the whole the country proved loyal.

The determination of England to treat Tibet as an independent power, which was to remain neutral territory between the dominions of Russia and Great Britain, led to constant friction with Russia. The government of India in 1903 invited Tibet to send representatives to a conference for the settlement of various misunderstandings, and when the request was refused an expedition under Colonel Younghusband was dispatched into the country. After a difficult march and some severe fighting, the force reached and took Lhasa. The grand lama fled, a new ruler was appointed who was more favorable to British interests and a treaty was made which secured important commercial concessions to the English. Russia objected on the ground that England was establishing a virtual protectorate over Tibet, but the English government steadily maintained that its object was to secure the commercial rights of India and not to annex Tibet. Population in 1911, 315,132,537.

Consult Lindsay's *India, Past and Present*; Frazer's *British Rule in India*, and Scott's *In Famine Land*.

**India Ink**, an indelible, true black ink, without shade of any other color. It is manufactured in China and in India. The Chinese make it from soot, which they mix with some kind of a gum, the soot or lampblack being prepared from the oil of sesame. In China India ink is used in both writing and painting, and it is applied with a brush. In Europe and the United States its principal use is in pen and ink drawings. Formerly India ink was made from a black secretion of the cuttlefish. See SEPIA.

**Indian, EDUCATION OF THE.** The first systematic attempt to educate the American indian was made by John Eliot in 1646 and the years immediately following. Eliot learned the language of the neighboring tribes, translated the Bible into this language and had copies of it printed on the first printing press set up in the United States. His efforts were so successful that during his lifetime he established fourteen towns of what were known as "praying indians." He induced the inhabitants of these towns to adopt the customs and dress of civilization and to be governed by the ordinary civil and religious laws of the State and Church. Eliot was followed by others, but, unfortunately, the



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differences between the indians and the whites, leading to King Philip's and other indian wars, destroyed all of the results of their work, and nothing of importance was attempted for more than a century.

There was no attempt on the part of the government after the Revolutionary War to educate the indians, but the Cherokee and Creeks in Georgia were influenced by a number of white people who settled among them, to adopt some of the ways of civilization. Many of these indians learned to write and organized their tribes on a plan similar to that of the United States government. They were making excellent progress towards civilization when, during Jackson's administration, they were all removed to Indian Territory.

The first appropriation by Congress for indian education was in 1819, and the sum appropriated was \$10,000. From that time to the present, yearly appropriations have increased, until now they exceed \$3,500,000. These appropriations were at first applied to the support of schools founded by various religious denominations which believed it to be their Christian duty to educate the indians. As the schools increased in number, considerable jealousy developed among the different denominations, and the constitutionality of the appropriation to such schools was questionable. For these reasons, in 1901 the appropriations were withdrawn by Congress, and all money since appropriated by the government has been devoted to the support of government schools. These schools are of three classes, day schools, reservation boarding schools and non-reservation boarding schools.

**DAY SCHOOLS.** There are about 150 of these schools now supported by the government. They are located near the homes of the indians, so that both old and young are brought under the influence of the school. In some of these schools lunches are served during the intermission. All are in charge of the teacher and his wife, who assists in teaching the girls the various occupations connected with housekeeping and attempts to influence the mothers to change their manner of life. These schools enroll between 5000 and 6000 pupils.

**RESERVATION BOARDING SCHOOLS.** These are established on the reservations and are open to children of both sexes. They require the pupils to reside in the institution during the school year, where they are brought under the influences of civilization. Over ninety of

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these schools are now maintained, and they enroll, in all, about 12,000 pupils. The best results are obtained in the smallest schools, and in no instance is it intended that over 200 pupils shall be gathered in a school. These institutions are located in Arizona, Oklahoma, South Dakota, Minnesota and on some other reservations.

**NON-RESERVATION BOARDING SCHOOLS.** These are institutions providing a higher order of instruction than the reservation boarding schools. In addition to the ordinary work of the school, somewhat extended courses in industrial work are provided. The most noted of these is the school at Carlisle, Pa., which has an enrollment of more than 1200 (See UNITED STATES INDIAN TRAINING AND INDUSTRIAL SCHOOL). The one next in importance is the Haskell Institute, at Lawrence, Kan., which has an enrollment of about 1000. In addition to these, there are schools at Salem, Ore., Chillico, Okla., Phenix, Ariz., and in several places in California, South Dakota and Wisconsin. In some of these schools what is known as the *outing plan* is practiced. By this plan the students are placed in the families of farmers during the year, where they earn good wages, attend the public schools and are brought more directly under the family influence. In many instances this plan has been very successful.

**SCHOOLS OF OKLAHOMA.** When the Creeks, Cherokee and other tribes were removed to Indian Territory, they continued to maintain the institutions of civilization which they had previously established. In the course of time, what are known as the five civilized tribes, namely, the Cherokee, Choctaw, Chickasaw, Creeks and Seminole, established systems of public schools in their respective nations. They built excellent school houses, but until recently the results obtained from their efforts were not of the best, because of the work of unscrupulous local politicians. These schools are now under the direction of a superintendent appointed by the national government, and political influences have been removed. Most of the indians of these tribes have adopted the ways of civilization, have learned to read and write English and have also obtained a working knowledge of most of the branches taught in the common schools.

The government of indian schools is under the direction of the department of the interior and immediately under the supervision of the superintendent of indian schools, appointed by the

president. Under this superintendent are five supervisors, each looking after the work in a district to which he is specially assigned. The purpose of the schools is to teach the indians the English language and to bring them under the influences of civilization. Those who are most thoroughly conversant with the work and are securing the best results encourage the indians to maintain their traditions, such as their songs, folklore and many of their tribal and family customs. Education assists them to use these to much better advantage than they could in the uncivilized state, and it is the opinion of all students of ethnology that the traditions of the American indian should be carefully preserved.

Besides government schools, there are many schools established by the different religious denominations, all of which are doing work similar to that already described. Many of these schools maintain efficient corps of teachers and are exerting an excellent influence upon the tribes in which they are located.

**Indian'a**, the Hoosier State, one of the east North Central states, bounded on the n. by Lake Michigan and the State of Michigan, on the e. by Ohio, on the s. by Kentucky and on the w. by Illinois. The boundary line on Lake Michigan extends east and west through a point ten miles north of the most southern point on the lake shore. The southern boundary is bordered by the Ohio, but all the islands in the river belong to Kentucky. The southern half of its western boundary is formed by the Wabash. The greatest length of the state is 277 miles, its greatest width is 145 miles and its area is 36,354 square miles, of which 309 square miles are water. Population in 1910, 2,700,876.

**SURFACE AND DRAINAGE.** Indiana is in the prairie region and its surface is similar to that of Illinois. The highest land is in the northeastern part of the state, where elevations of 1000 and 1200 feet are found. The elevation of the northwestern part is from 500 to 700 feet. Bordering on Lake Michigan is a chain of sand hills or dunes which have been formed by wind (See DUNES). These hills are of great interest to geologists and are frequently visited by geological parties. There are a number of low marshes near the lake, some of which have been drained and transformed into excellent farms for growing vegetables. Along a line extending from the northeastern corner of the state to Logansport is a range of low sand hills, containing a number of depressions in which small

shallow lakes are found. Several of these lakes have become favorite summer resorts.

South of this region and extending to a line running across the state just south of Indianapolis to the Wabash River is a broad level plain, with scarcely any variation in altitude, but this region blends into a rolling prairie north of the Wabash. The southern part of the state has a decidedly broken and uneven surface. This region includes the counties bordering on the Ohio and those adjoining them on the north. The region contains no high hills nor mountains, but in some sections there are extensive limestone formations, which have been washed by underground streams. In some places the streams have disappeared, leaving sink holes and caverns. Some of these caverns contain formations of rare beauty. The most noted is Wyandotte Cave, which yearly attracts many visitors (See WYANDOTTE CAVE). This remarkable formation is second in size to Mammoth Cave, being about 23 miles long.

A small portion of the northeastern part of the state is drained by the Maumee into Lake Erie, and the Kankakee in the northwest drains a large area into the Illinois River and thence to the Mississippi. The southeastern counties are drained by the Whitewater, which enters the Ohio just across the eastern boundary. The remainder of the state is drained by the Wabash and its tributaries. The Wabash traverses the state from the northeast to the southwest and is joined by the White, its principal tributary, which, with its west fork and other tributaries, drains a large part of the south central region. The streams flowing into the Ohio from the southern counties are short and of little importance.

**CLIMATE.** The extent of latitude covered by Indiana causes a difference of about 9 degrees between the mean temperature of the northern and the southern tiers of counties. The summers are usually warm, and during July and August many hot days are experienced. Owing to the sweep of the north winds the winters, especially in the northern part of the state, are often severe, having from 75 to 90 days of freezing weather and sometimes as much as 40 inches of snow. In the southern half the winters are short and mild, and the snowfall here seldom exceeds 15 inches. The rainfall varies from 30 to 50 inches and is heavier in the south than in the north, the average for the state being about 43½ inches; but the periods of precipitation are unevenly dis-



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tributed. July and August are liable to be dry months.

**MINERAL RESOURCES.** The coal measures of Indiana are located in the southwestern part of the state and have an area of over 6000 square miles. Many of the mines yield an excellent quality of bituminous coal and the output is steadily increasing, and now exceeds \$15,000,000 in value yearly. The petroleum industry is also important, but since the opening of the Illinois fields this industry has declined, because of the removal of operators to the new fields. The state ranks first in the production of lime and second in the production of Portland cement. The output of building stone is also of great value, the Bedford limestone having acquired a wide reputation. Brick and tile clays are widely distributed over the state and give rise to important industries.

**FISHERIES.** The fisheries comprise musselshells, pearls and slugs, and among the larger fish, German carp, buffalo, sheepshead, lake herring, lake trout, whitefish and trout. This industry gives employment to about 1000 men and yields a yearly income of about \$225,000.

**AGRICULTURE.** Agriculture is the leading industry of Indiana, and over 94 per cent of the tillable land is under cultivation. Hardwood forests are scattered over the state, though, except in the southern counties, they now cover only small areas, so that they do not interfere with agriculture. With scarcely an exception the soil is fertile and the rainfall abundant. The chief crops, in the order of importance, are corn, wheat, oats and hay. The counties near Chicago are well suited to truck farming, and large sections in this region are devoted to that branch of agricultural industry. Stock raising also receives attention throughout the state. There are large areas of valuable pasturage, and large numbers of horses, cattle, sheep and swine are raised. However, the raising of sheep is now confined almost entirely to the northwestern counties. Fruit is quite generally grown throughout the state, and in the southern half potatoes, plums, pears and small fruits are raised in quite large quantities.

**MANUFACTURES.** Hammond, East Chicago and Gary are important manufacturing centers near Chicago. The first has extensive meat packing houses and the other two are noted for the manufacture of iron and steel and their products. Gary has the largest steel works west of Pittsburgh. Sawmills are found in forested regions, brick and tile works are distributed over the

## Indiana

state and there are numerous factories for the manufacture of agricultural implements, automobiles and other wares. At South Bend is the largest wagon factory in the world. A considerable quantity of coke is manufactured and the manufacture of cotton, woolen and knit goods forms an important and growing industry. The manufacture of glass, which was formerly one of the leading industries, has declined, owing to the failure of the supply of natural gas, and some factories removed to other localities.

**TRANSPORTATION.** Indiana is traversed from east to west and from north to south by a large number of trunk lines of railway, which have their western centers in Chicago and Saint Louis and their eastern centers in New York, Boston and other large cities. With the exception of the two southern tiers of counties, all portions of the state are well supplied with railway facilities, but owing to the unevenness of the land in this region only a few lines have been constructed here. The entire mileage of the state exceeds 6600 miles, and in addition to this there are numerous electric lines joining cities to near-by towns, and the tendency is to extend these so as to form lines of communication across the state in various directions. The Ohio is the only navigable river which is of value to the state as a means of transportation.

**GOVERNMENT.** The legislative department consists of a senate of 50 members, elected for four years, and a house of representatives of not more than 100 members, elected for two years. The legislature meets every other year. The executive department consists of the governor and the lieutenant governor, each elected for four years, a secretary of state, a treasurer, an auditor, an attorney-general and a superintendent of public instruction, elected for two years. The judicial department consists of the supreme court, an appellate court and circuit courts. In addition to these there are superior courts in the large cities. In local government the township has greater recognition than in most states in the central part of the country.

**EDUCATION.** The state has an excellent school system, based upon the township plan. According to this, the township is the smallest unit for public school administration, and the schools of that unit are placed in the hands of a trustee who is elected by the voters of the township. The schools of each county are under the supervision of a county superintendent, who is chosen by the school trustees of the county. The public school fund amounts

## Indiana

to over \$10,000,000, and the annual expenditures for educational purposes exceed \$14,500,000. The University of Indiana at Bloomington is at the head of the public school system. Purdue University, with the state agricultural and technical school, at Lafayette, and the state normal school at Terre Haute are also parts of the public school system. Other important educational institutions in the state are De Pauw University at Greencastle, Indianapolis University, the University of Notre Dame, Wabash College, Vincennes University, Rose Polytechnic Institute, the normal college at Valparaiso and a number of private normal schools, located at Angola, Rochester and Muncie.

**INSTITUTIONS.** The hospitals for the insane are located at Logansport, Richmond, Evansville and Indianapolis; the state soldiers' home is at Lafayette; the soldiers' orphans' home is at Knightstown; the school for the deaf, the dumb and blind is at Indianapolis; the state reformatory is at Jeffersonville, and the penitentiary is at Michigan City.

**CITIES.** The chief cities are Indianapolis, the capital and largest city; Evansville, Fort Wayne, Terre Haute, South Bend, Muncie, New Albany, Anderson and Richmond, each of which is described under its title.

**HISTORY.** The first permanent white settlement in Indiana was made at Vincennes (1734) by emigrants from Canada. But as early as 1680, La Salle had made explorations in the Ohio and Wabash valleys, and early in the eighteenth century trading and military posts, missions and settlements had been made at several points. The territory constituted a part of New France until 1763, when it was ceded to England. By the treaty of 1783 it became a part of the United States, having been conquered during the Revolution by a band of frontiersmen under George Rogers Clark. Indiana became a territory in 1800, including Michigan, Illinois and Wisconsin. In 1809 it was reduced to its present size. In 1811 the indians, who had been giving constant trouble, were defeated by General Harrison at the Battle of Tippecanoe. Indiana became a state in 1816, with a constitution forbidding slavery. After a period of financial weakness and political confusion, the state steadily prospered; and it has taken advanced steps toward the solution of political and industrial problems, such as the establishment of an industrial arbitration tribunal and an anti-trust law. The state has

## Indianapolis

been doubtful in politics for many years and has been the scene of memorable political battles. Consult Dunn's *Indiana* in the American Commonwealths Series.

**Indian Affairs.** The relation of the indian to the United States government is peculiar. He is treated not like a foreigner, nor like a citizen, but, in the words of the law, "as a domestic, dependent nation." Though authority to govern the indians rests entirely with Congress, it is the tendency of that body to place in the hands of the indians themselves, as long as a tribal organization is maintained, all powers of local government. In accordance with this theory, the United States government has by means of treaties gained possession of the lands within United States territory claimed by the indians and has restricted the tribes to certain comparatively small areas, where they are free to make their own regulations, subject to the Constitution and laws of the United States, and also to set up and administer courts (See INDIAN RESERVATIONS). This right, however, has been decidedly restricted within recent years.

Congress licenses traders among the indians and closely supervises their transactions by means of a bureau in the department of the interior, presided over by a superintendent of indian affairs, appointed by the president and confirmed by the Senate. He is assisted by inspectors, superintendents and agents, each of whom has a special duty in supervising the affairs of a special tribe. The president also appoints teachers and sends mechanics to the indians, the government having full control of certain indian schools, such as the training schools outside of the reservations and different kinds of boarding and day schools within the reservations. It also makes contracts for schools to be conducted by religious associations, and it formerly contributed funds for the support of these schools (See INDIANS, AMERICAN; FIVE CIVILIZED TRIBES; INDIAN, EDUCATION OF THE). The indians who receive individual allotments of land may be admitted to citizenship by naturalization, and they are by many states given the right of suffrage. There are probably twenty thousand indian voters in the United States.

**Indianapolis, IND.,** a city, the county-seat of Marion co., capital of the state, 110 mi. n. w. of Cincinnati, on the Pittsburg, Cincinnati, Chicago & Saint Louis, the Lake Erie & Western, the Pennsylvania, the Monon and several other railroads. The city is noted for its wide,



## Indian Archipelago

well-paved and beautiful streets. The chief business streets are Washington, Market, Maryland and Georgia. Meridian, Pennsylvania and Delaware, the three finest residence streets in the city, Illinois, Massachusetts, Indiana, Virginia and Kentucky avenues radiate from Monument Place, a circular plaza in the center of the city. Woodruff Place, a residence park, is also of interest. There are nine public parks, nearly 1200 acres in area; Riverside, Garfield and Brookside are the most important. The first cemetery was Greenlawn, and others are Crown Hill Cemetery and several Roman Catholic, Lutheran and Jewish cemeteries.

The most notable structure in Indianapolis is the Soldiers' and Sailors' Monument, standing in Monument Place. It was designed by Bruno Schmitz and cost over \$500,000. The state-house, costing \$2,000,000 and occupying two large blocks, is the most noteworthy building. Others are the county building, costing \$1,750,000; the new Federal building, containing government offices; the police building, the public library, Tomlinson Hall, the Commercial Club, the Columbia Club, the Majestic, Law and Stevenson office buildings, and Claypool Hotel. There are 12 Roman Catholic churches in the city, 47 Methodist, 16 Presbyterian, 7 Episcopalian, 34 Baptist, 10 Congregational, 7 Lutheran and a few others. There are also many charitable institutions.

Indianapolis is the seat of the University of Indianapolis, including an academy known as Butler College, and law, medicine and dentistry departments. There is an excellent public school system and various other educational institutions. Among the important industries of the city are slaughtering and meat packing, iron works of various kinds, flour, grist and lumber mills and manufactories of carriages, wagons, furniture and malt liquors. There are also extensive printing and publishing establishments.

Indianapolis was settled in 1819, received its name two years later and became the capital of Indiana in 1825. The growth of the town dates from the opening of the first railroad in the state, in 1847. Since the introduction of natural gas, in 1889, the manufactures have increased rapidly and the city has grown. Indianapolis has had among its citizens Henry Ward Beecher and Benjamin Harrison. Population in 1910, 233,650.

**Indian Archipelago.** See MALAY ARCHIPELAGO.

## Indian Architecture

**Indian Architecture** comprehends a great variety of styles, among which we may distinguish, as the most important, the Buddhist style, the Jaina style, the Dravidian, or style of southern India, the Chalukyan style and the Modern Hindu, or Indian Saracenic, style. All these styles possess certain common traits, among which are minute and profuse ornament, executed in laborious carving; the use of many horizontal lines and bands, giving a stratified appearance; a repetition of the same motive, and a neglect of structural requirements. Among the principal forms of Buddhist architecture, which prevailed between the third and seventh centuries A. D., are the following: First, the *topes*, *stupas*, or towers, built to mark some sacred spot, and the *dogobas*, constructions of a similar nature, containing relics of Buddha or Buddhist saints. These buildings generally consisted of a circular stone basement, varying from 10 or 12 to 40 feet in height, and from 40 to 120 feet in diameter, on which rose a rounded, dome-like structure, generally of brick or small stones laid in mud, the whole edifice rising sometimes 50, sometimes 100, feet high. Second, the rock-cut *chaitya halls*, or churches, and the *viharas*, or monasteries. In rock-cut buildings architectural skill is confined to the façade and the interior, which are generally cut out with most beautiful and perfect detail.

The Jaina style, most highly developed in the eleventh century, is an outgrowth or corruption of the pure Buddhist. The temples in this style consist of a small sanctuary, surmounted by a lofty and nearly solid tower, the whole standing in a court surrounded by small cells, each surmounted by a smaller dome. The Dravidian style, that of the peoples of southern India, arose not earlier than the tenth century. The characteristic feature here is the *gopura*, a lofty, truncated pyramid, covered with countless bands of sculpture and carved ornament.

The Indian Saracenic style is a general name for a number of somewhat varying styles, the result of the mixture of Saracenic principles of architecture, brought by the Mohammedan conquerors of India, and the distinctive architectural features of the different localities where they settled. Under the Mogul emperors in the sixteenth century were erected some most magnificent buildings, such as the tomb of Humayun Shah at Old Delhi, that of Akbar at Secundra, the palaces of Shah Jehan at Agra and Delhi, and the Taj Mahal, built by the same monarch at Agra. See TAJ MAHAL.







## AMERICAN INDIANS

1, Mandan.  
2, Blackfoot.  
3, Dakota.

4, Yucatan.  
5, Sioux.  
6 and 7, Pueblo.

8 and 9, Mexican.  
10, South American.  
11, Apache.

12, Bellacoola.  
13, Eskimo.



## Indiana University

**Indiana University**, a state institution at Bloomington, Ind., chartered as a university in 1838. It comprises collegiate, law and graduate departments. It also maintains a summer school and a biological station on Winona Lake. The faculty numbers about 90, and the enrollment is about 1500. The library contains over 86,000 volumes.

**Indian Cau'casus.** See HINDU-KUSH.

**Indian Corn.** See CORN.

**Indian Hemp.** See HASHISH.

**Indian Mal'low** or **Vel'vet Leaf** or **Stamp Weed**, a weed of the mallow family, a native of Asia, naturalized in the United States. It is now a troublesome weed in all cultivated lands, especially in cornfields throughout the central states. It grows to a height of four feet, has heart-shaped, velvety leaves and flowers half an inch broad and of a bright orange-yellow color. The fiber of the plant is almost as strong as hemp. See WEEDS.

**Indian Ocean**, a large sea, separated from the Pacific Ocean on the e. by the Malay Archipelago and Australia and from the Atlantic Ocean on the w. by Africa. It is bounded on the n. by Asia. It extends to the Antarctic Circle on the s., although many geographers consider the part of the ocean south of latitude 40° south as the Southern Ocean. The northern shores are broken up by the projection of the peninsulas Arabia, India and Indo-China. Among the numerous islands in the Indian Ocean, Madagascar and Ceylon are the most important. The chief affluents are the Selwin, the Irawadi, the Brahmaputra, the Ganges, the Indus, the Chat-el-Arab, in Asia, and the Zambezi, in Africa. The winds over this ocean are gentle, though hurricanes are very frequent. The greatest depth is found in the northeastern part, where soundings have been made of 20,340 feet. The average depth is about 10,970.

**Indian Reservations**, *rez ur va'shunz*. For some years the United States has made treaties with the indians, reserving to them certain tracts of land, over which the United States continues to exert control, but where the indians are supposed to be protected from the imposition of the whites. The affairs of the reservation are conducted by an agent or superintendent, responsible to the commissioner of indian affairs, who is at the head of a bureau in the department of the interior (See INDIAN AFFAIRS). Indians on reservations are not citizens of the United States, though they may become so by settling on other lands, as ordi-

## Indians

nary white settlers do. Many indians have accepted the conditions, and there are now more than 20,000 indian voters in the United States (See FIVE CIVILIZED TRIBES).

The Navaho reservation in Arizona has an area of about 9,500,000 acres and is the largest single reservation; South Dakota has in its seven reservations over 8,500,000 acres, and there are in the United States about 140 other reservations.

**Indians**, AMERICAN. The name *indians* was given by Columbus to the tribes inhabiting the American continent at the time of its discovery, because he had the notion that the land was a part of India. To science these tribes are usually known as the *American*, or *Red*, race, and they are considered as an original stock or as a mixture of various races of European or Asiatic origin. Their chief characteristics are long, black and straight hair, scanty beard, heavy brows, receding forehead, dull and sleepy eyes and prominent, wide nose, full, compressed lips and a broad face with high cheek-bones. They vary in size and shape, are frequently tall and symmetrical and generally have small and well-proportioned hands and feet. The indians were distributed over the whole of the western continent and varied in character as much as in stature, if we contrast the civilized peoples of Mexico and South America with the cannibal tribes of the tropics. In this article the Eskimo are not considered, though some writers treat them as belonging to the American race (See ESKIMO). It is probable that in the whole of America there are about 12,000,000 indians, of which less than half are to be found in North America. At the time of the discovery of America it is probable that about 200,000 indians resided east of the Mississippi River, while in 1910 there were in the entire United States only 265,683.

**NORTH AMERICAN INDIANS.** *Villages.* When Columbus discovered America the indians lived in villages, each tribe by itself, in dwellings peculiar to the tribe. Among the Pueblo indians in the southwestern part of the United States the houses were then, as now, built of mud and crowded together one above another upon the plain, or were built in almost inaccessible caves in the sides of high cliffs. In the Lake region, circular huts of bark, split in broad slabs, were built, while to the east and south, the wigwams were of the same material, but rectangular in shape. The plains indians, who traveled about much more than the tribes of



the east, built temporary *tepees*, or wigwams, of poles, over which they stretched skins of buffalo and other large animals. Generally one house was larger than any of the others, and in this the chiefs met for council; and around it was an open space, where the indians met for worship or amusement.

*Dress.* The everyday dress of the indians consisted of little clothing—no more than was necessary for comfort, some tribes going almost entirely naked. From the skins of animals, fibrous plants and the bark of trees the indians constructed the few garments which were necessary, except in the southwest, where the Pueblos made serviceable woolen garments. In times of ceremony most of the tribes dressed elaborately, with showy garments bedecked with shells, teeth, feathers and other bright objects. Enormous headdresses of feathers and brilliant necklaces, metal ornaments, earrings and bracelets were also a part of this full-dress costume. Not uncommonly the indians tattooed themselves, and always before going to war or engaging in any other great undertaking they painted their faces and bodies with bright colors in fanciful designs, which showed the tribe to which the indians belonged and their purpose in painting themselves.

*Food.* Most of the tribes cultivated corn, beans and squashes, and some of them, like the Pueblos, lived almost entirely by agriculture. Whenever possible, the indians ate freely of fruits and of other edible parts of many plants. The northern indians gathered and stored wild rice and cranberries and made syrup from the maple trees. East of the Alleghany Mountains tobacco was a general product, and along the seacoast and the Great Lakes fish formed a staple article of food. West of the Mississippi the indians were great hunters, but it is manifestly unfair to say that indians in general lived wholly by the chase. Except in times of scarcity, they were well fed and lived healthily and at ease.

*Language.* Tribes that lived near one another were able to communicate by means of signs or with a jargon of mixed words from all languages, and while many of these languages seem to have come from the same stock, yet more than fifty distinct and unrelated languages have been noted.

*Domestic Animals.* To our mind, the plains indian is so associated with his horse that it is surprising to remember that until the Spaniards brought the animals to this country there were no horses here. Domestic animals, in fact, were

very rare, the dog being the only one that was common and almost universal. To many tribes he was a beast of burden, a companion-hunter and a protector.

*Industries.* Flint, obsidian and pipestone were used by the indians in making most of their implements, such as knives, spears, fishhooks, sewing needles, axes, pots, bowls, mortars and pipes. Many of these were cut out with considerable skill and were handsomely decorated. Some tribes made an article of pottery from clay, and though they did not understand how to glaze it, yet some of their work was capable of taking a high polish. From rushes and grass and the fibers of various plants, such as hemp and cotton and their like, they wove coarse fabrics, and some tribes constructed household utensils with marvelous skill; for instance, baskets of graceful shape, beautified by antique designs, were woven so closely as to be waterproof. They understood the art of preserving skins and making fine leather from them. This and all other industries were practically in the hands of the women, for the men considered it a disgrace to labor.

*Games and Amusements.* Boys and girls played happily very much as their white brothers and sisters do, imitating in their childish way the labors and amusements of their elders. The girls had dolls, often dressed skilfully in the costumes of grown men and women; while the boys played with bows and arrows, walked on stilts, wrestled among themselves or went on mimic hunting and fishing expeditions. The adults, too, were fond of amusements, most frequently of an athletic type. They played ball, ran races, wrestled, danced, feasted and told stories, and many times neighboring tribes joined in exciting contests. They sang on all occasions, but their music was coarse and rude, being, in fact, little more than monotonous chants. They had rude drums, whistles, rattles and flutes, all of which were more noisy than musical. Betting and gambling were very common among the men, who frequently lost all their possessions when luck was against them.

*War.* The highest ambition of a youth was to be a great warrior, for the tribe celebrated the deeds of its leaders and kept a record of their valiant doings. In most instances the indians were courageous to a degree, wore no armor and fought savagely with bows and arrows or knives, hatchets and spears of stone. The indians were cruel and usually scalped the dead, and the victors put their captives to death, sometimes

## Indians

with cruel torture. Occasionally, however, these captives were adopted by the victors and became loyal members of the tribe that had subdued them. The victorious fray was always celebrated with feasting and dancing, and sometimes the flesh of conquered braves was eaten by the victors in the belief that the virtues of the dead would be transmitted to the living.

*Burial.* Though the customs varied in different localities, yet great respect was paid to the dead, and efforts were made to preserve the bodies and protect them from indignity. Usually the favorite possessions of the deceased were buried with him, sometimes in the earth, but occasionally on platforms among the trees.

*Government and Religion.* It is difficult to give any account of the government and religion which will apply to all the tribes, but in general each tribe was composed of a number of related families or clans. The oldest man in each clan was its leader and ruler, and in turn the oldest head of a clan was the chief of the tribe. Marriages among members of immediate families were forbidden, but there were rarely any marriages outside the members of a tribe, except in those cases where tribes were gathered in a confederacy. Children usually belonged to the mother and were cared for by her relatives, so that a man kept ward over his sister's children rather than his own. Laws were very strict, and punishments were severe. Land was not owned by individuals, but personal property was so held. The limited rights of woman were respected, especially in the household, but the man was supreme. Some tribes held slaves, but the practice was far from common.

For the indian there was no supreme god; each tribe had its own spirit, that was its special patron. Every living thing was inhabited and controlled by a spirit. The sun, moon and stars were the great spirits; the wind was the breath of the gods, and rain and snow were poured upon the earth by the kindly spirits. The animal or plant which was to any particular tribe most important might become the chief spirit for that tribe, as, for instance, on the plains the buffalo held this rank. The priest and the medicine man were one and the same person, in his latter capacity curing by charms and ceremonies because of his priestly characteristics. While a few simple remedies were used, yet each indian carried his private charm, which was supposed to protect him from injury and assist in his cure when ill.

## Indians

*Tribal Families.* The indian tribes of North America may be gathered into a number of families which show some relationship in language and various habits and customs. The principal families are the Algonquian, Athapascan, Caddoan, Iroquoian, Muskhogean, Shoshonean and Siouan, to each of which is given an article in the body of this work.

*Present Condition in the United States.* What has been said so far in this article relates to indians as they were at the time of the discovery of America but since then there has been a remarkable change in their condition. In the northern part of the United States the French, and at the south the Spanish, intermarried freely, and the mixed breeds which resulted have become civilized and adopted the customs of their white neighbors. The other European colonists rarely mixed with the indians, but have endeavored to teach them their arts. War and conquest followed this, and the indians were gradually driven away from their hunting grounds, across the Mississippi River and into mountain fastnesses or desert and unprofitable regions. Here and there the remnants of tribes have been gathered into gradually lessening tracts of land, called reservations, where the indians live under the protection of the United States; but as they do not understand private ownership in land and cannot readily accommodate themselves to the plans of the whites, trouble has frequently arisen. Some few tribes have proved more tractable than others and live comfortably as we do. Very few wild tribes now remain in the United States. See INDIAN AFFAIRS; INDIAN, EDUCATION OF THE; INDIAN RESERVATIONS; FIVE CIVILIZED TRIBES, and the many articles on single tribes.

*MEXICAN AND CENTRAL AMERICAN INDIANS.* At the time the Spanish invaded Mexico and Central America, they found there many tribes having a civilization almost the equal of their own. These indians built permanent houses of squared and polished stone, had a written language and many books, knew something of arithmetic and a little of astronomy. They made finely woven cloths, brilliant feather work and beautiful ornaments of gold and silver. Of iron they knew nothing. Their religion, bloodthirsty and cruel, was characterized by human sacrifices, and their priests exerted a power little less than that of the king himself (See AZTEC; CORTES, HERNANDO; MONTEZUMA; YUCATAN). In contrast to these, the indians of Lower California were the most degraded savages known.



## Indian Summer

**SOUTH AMERICAN INDIANS.** Along the western coast of South America, from a few degrees north of the equator to 25° south of it, were several tribes with a civilization equal to that of the Aztec in Mexico. They built great palaces, the ruins of which still exist, and ornamented them with fine work in gold, silver and bronze. The conquering Spaniards were amazed at the skill of the Indians and carried away with delight vast quantities of their ornaments (See ATAHUALPA; INCA; PIZARRO, FRANCISCO). The tribes of the tropical regions bordering the Amazon and Orinoco were wild and savage. They knew nothing of work, for the climate made clothing and shelter almost unnecessary, and the streams and forests produced food for the taking. Most of them were fierce cannibals, who did not preserve the scalps of their enemies, though in some cases the entire head was kept. The pampas Indians to the south were more like the plains Indians of the United States. They were not civilized, but had large herds of domestic animals and lived principally upon meat. See accompanying color plate.

**Indian Summer,** the season of fair, warm weather, which occurs usually in the late fall in the North Central and Atlantic states. It lasts from one to three weeks and may occur three or four times in one season. The air is usually especially dry at this time, and consequently forest and prairie fires are likely to start. The name is of obscure origin, though it was once believed that it was due to the fact that the Indians predicted this period, in conversation with the first Europeans who arrived in America.

**Indian Territory.** See OKLAHOMA, sub-head *History*.

**Indian Turnip.** See JACK-IN-THE-PULPIT.

**India Rub'ber** or **Caoutchouc**, *koo chook'*, a gum obtained from the milk-like sap of a number of tropical plants. While these plants belong to various species, they all resemble each other in having this milky juice, and are all known as rubber plants. The juice, which is technically called *latex*, must not be confused with the true sap of the tree. The exact function of the latex is unknown, but it has no connection with the health or growth of the tree. It usually is found in the tissues between the outer bark and the tree.

There are two common methods of making incisions to allow the juice to run out. The V-method, which takes its name from the shape of the cuts, is illustrated on the color plate (Figure 1). Another common method

## India Rubber

is the spiral, the incisions forming a single continuous line, instead of being separate loops. The juice is caught at the bottom of the tree in clay cups, like (c) in Figure 4. A third, but less effective, method is to make cup-like incisions in the trunk of the tree and then to cut grooves leading to these cups. The juice flows into the cups, from which it is taken in small dippers. Incisions are usually made at sunrise, as the sap is supposed to flow better at this time of day. The rubber, which is in the form of small globules, is now separated from the sticky sap by drying over a fire. The usual method is to dip a paddle, such as shown in Figure 4, in the sap, and hold it over the fire. As fast as the rubber on the paddle dries, more is added by dipping the paddle in the sap, until a mass weighing five or six pounds has been collected. This mass is removed from the paddle by cutting it through one side. It is then ready for shipment in the form of crude rubber. Figure 3 on the color plate shows the method of holding the paddle so that it may be turned easily and rapidly. When the crude rubber is received by the manufacturer it is sawed into pieces, as shown in Figure 5, in order that its quality may be ascertained.

In parts of Africa the natives smear their bodies with the juice and allow it to dry; then they scrape off the thin layer of rubber which remains and shape it into small balls. Sometimes the juice is allowed to trickle down the tree and dry on the bark, but this method is so wasteful that it is now seldom used. Before the production of rubber became a great industry the rubber-producing trees were often cut down to get all the juice; this is the least satisfactory method, as it destroys the tree and actually lessens the quantity it yields. A single tree yields from three to sixteen or seventeen pounds of crude rubber a year.

The great basin of the Amazon supplies nearly one-half of the world's output of rubber. Brazil in a single year exports over 40,000 tons of crude rubber, practically all of this amount being used by the United States and Canada. Trees of Brazil are native, as are those of Central America and Mexico, where rubber plantations yield a good income under proper management. The Kongo basin in Africa also supplies large quantities of rubber, most of which is sent to France, Belgium and other European markets. Since





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## THE RUBBER INDUSTRY

1—Native woman tapping rubber tree. 2—Carrying sap to central point. 3—One method of curing or "smoking" rubber. 4—Native tools: (a) for tapping trees; (b) coconut shell for carrying sap; (c) cup for catching sap; (d-e) paddles for "smoking." 5—Inspecting for purity. 6—African tree 14 months old. 7—Rubber tree leaves and seed. 8—Some manufactured products.





## Indictment

1880, when South American rubber trees were introduced into Ceylon and the Malay Peninsula, the East Indies have been a gradually increasing producer. India rubber is highly elastic, is a non-conductor of electricity and a poor conductor of heat. It has been in general use since about 1825. See RUBBER MANUFACTURE.

**Indictment**, *in dite'ment*. See JURY AND TRIAL BY JURY; PROCEDURE.

**In'digo**, a blue vegetable dye, extensively employed in dyeing and calico printing. The greater part of the indigo at the present day comes from India, especially from the provinces



INDIGO PLANT

of Bengal, Oude and Madras. The first cutting of the plants takes place about midsummer, and the second about two months later. The process of extracting the dye varies as the leaves are fresh or dried. The leaves are usually boiled and allowed to ferment under water. The liquid is then drawn off and beaten, in order that it may mix with oxygen, after which it is allowed to stand for some time. When the indigo settles to the bottom, the water is then drawn off and the indigo is cut and pressed into cubes, in which form it appears on the market. Commercial indigo contains about fifty to sixty per cent of pure indigo blue, the remainder consisting of substances called indigo gluten, indigo yellow and indigo red. Indigo dyes are made by dis-

## Indra

solving the coloring matter in liquids containing more or less ammonia or some other alkali. They are used in coloring silk, cotton and woolen goods and extensively in calico printing. See CALICO PRINTING; DYEING.

**Indigo Bird**, a finch which breeds in Northern United States but migrates beyond the southern boundary in autumn. The male is a brilliant dark blue, varying in intensity, and is marked about the head and chin with black. The indigo bird, which has a confiding disposition and is easily tamed, repays kindness with its sweet, peculiar song, which is continued into the summer, after most of the birds have ceased to sing.

**In'dium**, a metal discovered by Reich and Richter in 1863, by means of spectroscopic analysis in the zinc-blende of Freiburg. It has been obtained in small quantities and is of a silver-white color and soft. It marks paper like lead. The metal is related to cadmium and zinc, and its spectrum exhibits two characteristic lines, one violet and another blue.

**In'do-Chi'na**, a name sometimes given to the southeastern peninsula of Asia, comprising Burma, Siam, Cambodia, French Cochinchina, Tongking, Anam, Laos, Malacca and the Shan country.

**Indo-Eur'ope'an**. See ARYAN.

**In'door Base'ball**, a popular gymnasium game, that does not differ much in character and purpose from the outdoor game, except as it is of necessity modified to suit the small ground on which it is played. A floor 40 by 50 feet is almost a necessity, but the shape and size beyond that does not matter. The ball, which weighs 8½ ounces, is about 17 inches in circumference, and the bat is smaller than the one used in the outdoor game. There is a national indoor baseball association in the United States, which regulates the game and formulates the rules under which it is played.

**In'dra**, a Hindu deity, originally representing the sky or heavens, worshiped in the Vedic period as the supreme god, though he afterward assumed a subordinate place in the Pantheon. He is commonly represented with four arms and hands, riding on an elephant. When painted he is covered with eyes. He is at once beneficent, as giving rain and shade, and awful and powerful in the storm, as wielding the thunderbolt. In one aspect he is lord of *Swarga*, the beautiful paradise where the inferior gods and pious men dwell in full and uninterrupted happiness.

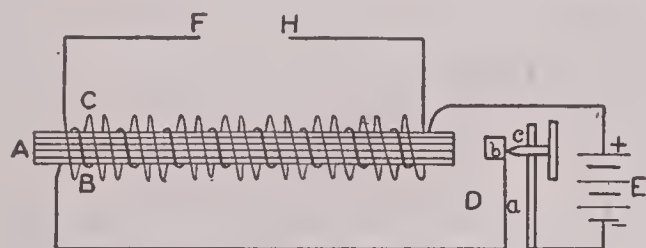


## Induction

**Induction**, in logic, that process of reasoning by which we rise from particular to general notions; it is the counter-process to deduction. In induction, particulars are not only raised into generals, but these are developed into still higher generalities. In following this method we proceed from the known to the unknown and obtain a conclusion much wider than the premises. See **INDUCTIVE METHOD**.

**Induction, ELECTRIC**, the action by which the distribution of a charge of electricity on a conductor is altered by the approach of an electrified body. When a body charged with one kind of electricity is approached toward an insulated conductor which originally had no charge, a charge similar to that of the influencing body is produced on the remote side, and an equal charge of the opposite kind is produced on the near side of the insulated conductor. It is to the mutual induction between the two coatings, one charged positively and the other negatively, that the Leyden jar is indebted for its large electrical capacity. See **ELECTRICITY**, subhead *How Electricity Travels*.

**Induction Coil**, an instrument for securing a high potential between direct and induced



electric currents. The principal parts of the coil are the *core*, *A*, usually made of a bundle of soft iron wire; a short *primary*, or *inner*, coil, *B*, of coarse wire; a long *secondary*, or *outer*, coil, *C*, of fine wire; an *interrupter*, *D*, and the *battery*, *E*. The coils are insulated copper wire and are carefully insulated from each other by coats of varnish or some other non-conducting substance.

The interrupter consists of a spring, *a*, to the upper end of which is soldered a small piece of soft iron, *b*, against which a screw, *c*, presses. The screw is tipped with a fine platinum point. When not in action, the end of the spring rests against the platinum point. As soon as the current passes through the primary coil, the core, *A*, becomes magnetized and attracts the piece of soft iron; but as soon as this touches the core, the magnetism ceases and the spring recoils to the platinum point. Thus the circuit is automatically opened and closed alternately. The current in the primary induces a current

## Inductive Method

of a higher potentiality in the secondary. Electro motive force is thus induced in the secondary coil at each make and break of the circuit. The high electro motive force of the secondary coil is due to the number of turns of wire in it. When the opposite ends of the coil, *F* and *H*, are brought near each other, a spark usually passes between them. Induction coils are used for medical purposes in laboratories and in common and wireless telegraphy and in telephones. See **ELECTRO-MAGNETISM**.

**Inductive Method**, in pedagogics, that method of instruction which proceeds from the individual to the general notion, or from separate ideas, gained through observation, that is, *a posteriori* information, to definitions, rules and classifications (See **A PRIORI** AND **A POSTERIORI**). It is also called the observational method and the method by discovery. Children obtain their first knowledge by observation and experience; hence they learn inductively, and from the comparison of ideas thus gained they form certain conclusions or class ideas, such as that a body without support will fall, fire is hot, two and two are four. In a similar manner, by the inductive method the child learns the principles of number and is led to formulate the rules for addition, subtraction, multiplication and division. In nature study he proceeds through the examination of plants and insects and other objects to discover certain facts common to all the objects of each class, as, that plants have leaves and insects have heads and legs. In the study of geography by the inductive method, the pupil would begin with the study of objects immediately about him, such as the forms of land and water and the plant and animal life around the schoolhouse and in the neighborhood. From this he would proceed to the study of the township and the county. During the progress of the study he would be led to classify and name those objects that are alike, such as hills, valleys, creeks and meadows. Having learned these classifications, later he would be able to apply them in the classification of similar ideas which he might obtain through reading descriptions of places which he has never seen.

The inductive method is the method best suited to instruction in primary grades. It conforms to the child's method of learning when he enters school, trains his powers of observation, keeps him interested in his work and, above all, leads him to acquire his ideas at first hand. With few exceptions it is also the best method to use in beginning the study of any subject. It is

## Indulgence

the method pursued in all scientific investigations, and it is that this method may be followed that the higher institutions of learning, such as high schools, colleges and universities, are equipped with expensive laboratories.

But the inductive method has its limitations and cannot be used exclusively. It requires too much time to be followed all through life; hence, when pupils arrive at the age where they can reason, they should depend upon the experience of others for a part of their knowledge. For instance, in the study of grammar, more knowledge can be acquired in a given time by beginning with definitions and rules and learning their application through the study of suitable illustrations in selections of literature, than by first discovering these definitions and rules by observation and experiment. Some studies, such as higher mathematics and history, are essentially deductive in their nature and cannot be successfully studied by the inductive method. Again, conclusions reached through the inductive method may be erroneous because they are based upon insufficient observation. See **DEDUCTIVE METHOD**; **METHODS OF TEACHING**.

**Indulgence**, *indul'jens*, a term in the Roman Catholic Church, meaning "a remission of punishment still due to sin after sacramental absolution, this remission being valid in the court of conscience and before God; and being made by an application of the treasure of the Church on the part of a lawful superior." "Indulgence can not be obtained for unforgiven sin. Before anyone can obtain for himself the benefit of an indulgence the guilt must have been washed away, and the eternal punishment, if his sin is mortal, must have been forgiven." In order to gain an indulgence the person must be a member of the Church and must do the work prescribed. In the Middle Ages almsgiving, pilgrimages and engaging in holy wars were means of obtaining indulgences. Indulgences are plenary and partial. A plenary indulgence is the total remission, and a partial indulgence a partial remission of the temporal punishment due for sin.

**In'dus**, the chief river of the northwest of Hindustan. It has a length of about 1800 miles and rises in Tibet, north of the Himalaya Mountains, at an elevation of 18,000 feet. The chief tributary of the Indus is the Shayok, and others are the Kabul, the Punjnad, the Sutlej and the Chenab. The Indus enters the sea by many mouths. Its delta extends about 130 miles along the coast. It is navigable from the sea up to its confluence with the Kabul River.

## Infantile Paralysis

**Indus'trial Arbitration.** See **ARBITRATION**.

**Industrial Education.** See **TECHNICAL AND INDUSTRIAL EDUCATION**.

**Industrial School**, a name which has been frequently applied to a class of schools intended for reformatory or philanthropic purposes, in which trades and industrial work of all kinds are taught. In such schools the industrial work is taught merely as a means of discipline, while the primary purpose is to develop character or intellectual power. Many states have established such institutions. These, however, are generally known by other names, as reform schools or reformatories. See **TECHNICAL AND INDUSTRIAL EDUCATION**; **MANUAL TRAINING**; **REFORM SCHOOLS**.

**In'fant**, a term applied in English and American law to persons who have not attained their majority, that is, the age of twenty-one years for a male and, in many states, eighteen years for a female, and are under guardianship. In general, contracts made by infants are not binding, except for necessities suited to their state in life. Being an infant is no bar to criminal proceedings; but young persons are not punished for offenses if they have not knowledge and discretion to distinguish them to be such. Infants require the consent of parents or guardians to marry. The jurisdiction in respect to infants is generally vested in either probate or orphans' courts. These courts appoint guardians to take charge of the property of infants, and, in case of the decease of both parents, to take charge of their persons; but during the life of the father he has the guardianship and control of the persons of his children until they are twenty-one years of age. In most states this power rests with the mother in case of the death of the father.

**Infantile Paralysis**, an infectious disease which in 1909 and 1910 became widely spread, and attracted the serious attention of physicians. Previous to 1907 it was practically unknown in the United States, and authorities believe that it was brought from Europe by immigrants. Its tendency is to become epidemic wherever it appears, and few if any states have been free from it. As the name indicates, the disease most frequently attacks babies and young children, though cases have been found among older people. The first symptoms are such as are common to various diseases of childhood—fever, vomiting, restlessness; but within a few hours, or at most a few days, the characteristic paralysis appears, usually in the legs or arms. Comparatively few cases prove fatal, but deformity



## Infantry

or permanent paralysis is the usual result.

A close study of the disease has failed to show the exact character of the contagion or infection. Some authorities believe it to be directly contagious; others hold that the bite of some insect is necessary for its transmission. That it can be carried by the bite of the stable fly has been proved conclusively by experiment, and the extermination of this relative of the house fly should be sought by every possible means.

**In'fantry**, the principal branch of modern armies (See CAVALRY; ARTILLERY). Infantry maneuvers rapidly and fights on foot. Most of the great armies of the past have been of infantry, and we read in history of the solid phalanx, eight or ten files deep, that moved with almost irresistible force against the foe. Such formations are no longer successful, since the modern rapid fire guns have been invented, guns which will throw bullets with such force that they pass through five or six ranks of troops. Accordingly, an open or extended order of advance is now necessary with infantry, and this openness requires more perfect discipline and more individual intelligence than when the infantryman was closely supported by his comrades. See ARMY; MILITIA; SMALL ARMS; TACTICS.

**Infec'tion**, a diseased condition produced by the growth of bacteria in the body. Every infectious disease, as scarlet fever, smallpox, diphtheria, typhoid or cholera, is propagated by some organism. These are freed from the diseased body by expectoration, coughing, breathing and various other means and are thus liable to be transmitted to others. This may be done either directly or through the contamination of drinking water or milk.

**In'fluen'za** or **Grippe**, a disease which usually appears as an epidemic and attacks human beings, horses and sometimes dogs and cats. The symptoms are those of what is usually called a severe cold; but this is accompanied by lassitude and great general depression, feverishness, nausea and even an inflamed condition in the throat and pharynx. Though the patient usually recovers within a week or ten days, he is liable to be left in a much weakened condition, in which other diseases, such as bronchitis or consumption, develop, or any organic weakness he may have had, much increases. The disease should not be treated lightly, but should be recognized as an affection requiring care.

**Infuso'ria**, a class of minute microscopic animals, so named from being frequently developed in infusions of hay or other organic sub-

## Inheritance Tax

stances. They are regarded as the highest group of the protozoans, but many of the so-called infusorians of former times are known now to be vegetable organisms.

**In'galls**, JOHN JAMES (1833-1900), an American statesman and writer, born at Middleton, Mass. He graduated from Williams College in 1855 and was admitted to the bar two years later. He went to Kansas in 1858, being interested in the antislavery movement which was centering there, became secretary of the state senate in 1861 and a member of that body in 1862. He entered journalism, became editor of the *Atchison Champion* and for his faithful party service was elected to the United States Senate in 1873 and was reelected in 1879 and 1885. During this service he displayed notable ability as a speaker and parliamentarian, and in his later years he attracted attention by his literary and oratorical talents.

**Ingelow**, *in'je lo*, JEAN (1820-1897), an English poet and novelist, of whose private life little is known. In 1863 she published her second volume of poems, which gained immediate and wide popularity; and some of the poems included in this volume, notably *The High Tide on the Coast of Lincolnshire*, *Songs of Seven* and *Divided*, have retained much of their early popularity. Jean Ingelow wrote *Mopsa the Fairy*, *Off the Skelligs*, *Sarah de Berenger*, *Don John*, *Fated to be Free* and *Stories Told to a Child*.

**Ingersoll**, ROBERT GREEN (1833-1899), an American lawyer, politician and agnostic writer, born in Yates County, N. Y. He began the practice of law in 1857 in Peoria, Ill., and in 1862 he was made colonel of a regiment of Illinois cavalry. He was appointed attorney-general for Illinois in 1866, having transferred his allegiance from the Democratic to the Republican party. At the national convention in 1876 he at once leaped into prominence by an eloquent speech in favor of the candidacy of James G. Blaine. He was best known, however, for his lectures and books in opposition to the common religious views, such as a personal Deity, an actual hell and heaven, the inspiration of the Bible, the divinity of Christ, immortality and everlasting punishment. His remarkable eloquence and personal magnetism gave him an influence in favor of agnosticism second only to that of Thomas Paine, from whom he drew most of his arguments. He was the author of several essays upon literary criticism.

**Inheritance Tax**, a tax on the succession of property from a deceased person to his lega-

## Initiative

tees. This tax has been used as a means of revenue by all countries since the time of the Roman Empire. In the United States all the states except eight have inheritance taxes. These differ widely in detail, but most of them differentiate between the succession of property to lineal descendants and the succession to distant relatives or those not related. The rate is usually progressive, that is, large inheritances are taxed at a higher rate than small inheritances, and there is usually an exemption varying from \$500 to \$5000. The highest inheritance tax levied in the United States is in California and Nevada. In those two states a person, not related to the deceased, inheriting any sum over \$500,000 is taxed 25% of the inheritance. England has regular inheritance taxes; but in Canada, as in the United States, the central government imposes none, though the provinces are permitted to levy them. Courts have held that deathbed gifts, made obviously to avoid the inheritance tax, are liable the same as any other part of the estate.

**Initiative**, a method of government by which the people may take the first step in the making of laws. It aims not to abolish the usual law-making bodies, but to supplement the work which they do, and is, like the referendum, spreading rapidly in the United States. In 1914 over a dozen states possessed some form of initiative legislation. Such laws differ in detail, but in general they provide that a small percentage of the voters of a state, generally from 5 to 25%, may petition for special legislation. According to the usual method, the measure must then be brought, without amendment, before the legislature. In some states, if the legislature gives an adverse vote the measure is dead; in others it is then brought before the people, and if carried by them becomes a law, the governor having no veto power in such cases. According to another method, which has not as yet become very firmly established, after the initial petition has been filed the proposition is submitted directly to the people.

The initiative has become very popular in city governments, where it is somewhat simpler in its operation than in state affairs, and several states permit initiative privileges in cities while denying them to the rest of the state. Oregon was the first state to embody initiative provisions of the most advanced kind in its constitution (1902), and Oklahoma followed five years later in its first state constitution. See **RECALL**; **REFERENDUM**.

## Ink

**In'ia**, a genus of mammals belonging to the dolphin family, containing only one known species, remarkable for the distance at which it is found from the sea. It frequents the remote tributaries of the river Amazon and even some of the elevated lakes of Peru. It has bristly hairs on its snout and grows to a length of eight feet. Its colors are extraordinary, some individuals being wholly pink and others black above and pink beneath.

**Injunction**, in American law, a writ issued under the seal of a court of equity to restrain the defendant from doing, or to order him to do, some act, according to justice. Thus an injunction may be issued to prevent a man from turning a stream of water from its course, to restrain a street-railway company from laying tracks on a street without gaining permission of the property owners, or to compel a man to tear down a fence which he has built on another man's land. An injunction is *temporary*, *provisional* or *preliminary*, until the coming of the defendant's answer; if that answer does not convince the court that the injunction is doing injustice, the injunction is made *perpetual*. Disobedience of an injunction constitutes contempt of court and is punishable accordingly.

**Ink**, a colored fluid used in writing and printing. The black writing ink of commerce is the most common kind. It is made from nut galls, copperas, gum senegal and water. Twelve pounds of nut galls, 5 pounds of copperas and 5 pounds of gum make 12 gallons of ink. In much of the ink placed on the market, logwood takes the place of nut galls, since it is somewhat cheaper. The iron in the copperas acts upon the tannin in the solution of nut galls and on exposure to the air turns this black. This is the reason why ink turns dark as it dries. The so-called writing fluids contain little or no coloring matter except such as is formed by the union of the copperas with the tannin, but inks usually contain other coloring matter, so that they can be more readily seen as they are placed upon the paper.

Colored inks are prepared by dissolving various dyes in water to which a solution of gum arabic or some other gum is added. Red ink is made from Brazil wood or carmine or aniline dye. Blue ink is colored by Prussian blue. Green ink is usually made from the aniline dye. Copying inks contain a small quantity of glycerine or sugar to prevent their rapid drying and to enable them to stick to the copying paper.



## Inkermann

Printing ink is made by mixing the best quality of lamp black with boiled linseed oil, to which a small quantity of soap and rosin has been added. This ink is thicker than paint and is thoroughly mixed and ground, making a preparation that will flow readily over the ink rollers and spread evenly upon the type. See PRINTING.

**Inkermann**, *in kur mahn'*, a locality of Russia, in the Crimea, at the head of Sebastopol harbor. It is famous for the victory of the allies in the Crimean War over the Russians, on November 5, 1854.

**In'man**, HENRY (1801-1846), an American painter, born at Utica, N. Y. He studied in New York City and soon became famous as a portrait painter. Among his famous portraits are those of Fitz-Greene Halleck, Chief Justice Marshall, William Wirt, John James Audubon, De Witt Clinton, Martin Van Buren, William H. Seward, William Wordsworth, Thomas Macaulay and many other famous men. At the time of his death he was painting a series of historical pictures for the decoration of the national capitol at Washington.

**Inn and Inn'keeper**. See HOTEL.

**Inness**, *in'es*, GEORGE (1825-1894), an American landscape painter, born in Newburg, N. Y. No painter has represented the aspects of nature in the American climate with deeper feeling or with a finer sentiment of light and color. His *American Sunset* was selected as a representative work of American art for the Paris Exposition of 1867. His pictures were also exhibited at the Paris Exposition of 1900. Among his many celebrated paintings are *A Vision of Faith*, *Rising Storm*, *The Afterglow* and *Sunset on the Seashore*.

**Innocent**, *in'no sent*, the name of thirteen popes. INNOCENT I, a cardinal deacon created by Saint Damascus, was elevated to the pontificate near the close of 401. In the same year he went to Ravenna in relation to the capitulation between King Alarie and the Senate of Rome. The following year the city was plundered by the Goths, but Innocent, after their departure, undertook to repair the damage they had done and to redecorate the churches they had despoiled. He espoused the cause of Saint Chrysostom, who had been unjustly deprived of the See of Constance. He governed the Church with exceeding benefit for over fifteen years and after his death was canonized. INNOCENT II, Gregorio de Papareschi, was pope from 1130 to 1143. He was opposed by a faction of the cardinals who set up Anacletus II as antipope. In 1133

## Innocents

he was installed in the Lateran at Rome by the emperor Lothair, but did not gain undisputed possession before the death of Anacletus in 1138. In 1139 he held the second Lateran Council and confirmed the condemnations pronounced by several previous councils on Abélard and the followers of Brescia. INNOCENT III, Giovanni Lothario Conti, after a distinguished career as a student at Rome, Paris and Bologna, was made cardinal, and eight years later, at the age of thirty-eight, he became pope. He was the greatest pope of the name and held office from 1198 to 1216. The chief aim of his ecclesiastical policy was to vindicate the papal claim of the supremacy of the Church over the State. He began with the restoration of the papal authority in Rome, but soon extended his influence to all parts of Europe. He forced Philip Augustus of France to take back his repudiated queen; instituted the fourth Crusade, which resulted in the capture of Constantinople from the Greeks and the establishment of the Latin Empire; compelled John of England to acknowledge the feudal sovereignty of the pope and pay an annual tribute; instituted the crusade against the Albigenses in 1208 and presided at the celebrated Lateran Council in 1215. He was, moreover, an energetic worker for public and private morality and lent his influence to the advancement of every good cause. He died in 1216, while busily engaged in promoting peace among the Italian cities. INNOCENT XI, Benedetto Odeschalehi, who was pope from 1676 to 1689, was an energetic and judicious reformer. Throughout his pontificate he was involved with Louis XIV in conflicts, of which the most serious arose when the pope attempted to put an end to the king's practice of keeping sees vacant and appropriating their revenues. The French clergy expressed their views of the matter in their *Four Propositions of the Gallican Clergy*. INNOCENT XII, Antonio Piguatelli, after filling a number of important diplomatic posts, was made a cardinal by Innocent XI and was elected to the papacy after a session of the conclave lasting nearly six months. During his papacy (1691-1700), he brought about a reconciliation with France after the French clergy had retracted the *Four Propositions*.

**Innocents**, FEAST OF HOLY, variously styled Innocents' Day and Childermas, a festival observed in the Western Church (including the Anglican) on the 28th, and in the Eastern Church on the 29th, of December, in commemoration of

## Innsbruck

the massacre of the children of Bethlehem by the order of Herod.

**Innsbruck**, *ins'brook*, the capital of the Austrian crownland of the Tyrol, situated in the Alps, at an elevation of nearly 1900 feet, 60 mi. s. by w. of Munich. The city lies on both banks of the Inn, in a broad valley surrounded by high mountains, and is a favorite resort of travelers. The town is very old. It received municipal privileges from Otho I in 1224. The old town lies on the right bank of the Inn and is connected with the new town by three iron bridges. There are many interesting old buildings in the city, one of them being the oldest Capuchin monastery in Austria, dating from 1598. The Franciscan Church contains a magnificent monument to Maximilian I, several monuments to Tyrolese patriots and a beautiful silver statue of the Virgin. Among other noteworthy features are a fifteenth century palace; the Imperial Palace; the Ottoburg, dating from the thirteenth century; the Tyrolese National Museum; the historic and beautiful Isel Mountain, and the famous medieval Ambras Castle, with its great collection of weapons. Innsbruck is the seat of a university founded in 1667 by Leopold I. The chief industries are cotton and wool spinning, glass painting and the manufacture of mosaics. Population in 1910, 53,194.

**Inns of Chancery**, *chan'sur ry*, buildings in London which were originally schools for the study of law, and which for a time were subordinate to the Inns of Court and had similar powers. They are now merely private societies of lawyers.

**Inns of Court**, four sets of buildings in London, belonging to four legal societies which have the exclusive power to admit persons to the practice of law. The name is also applied to the societies themselves. They are of very ancient origin and in the Middle Ages were the seat of law schools famous throughout Europe. At present they are practically clubs of attorneys. Each is governed by a committee, or board, which is self-perpetuating and which has the absolute right to admit or reject any candidate for admission to the bar or to disbar any practicing lawyer which it has admitted. The four buildings are by name the Inner Temple, the Middle Temple, Lincoln's Inn and Gray's Inn.

**Inoc'ula'tion**, in medicine, the introduction by a surgical operation of a minute portion of infective matter into the true skin, for the purpose of causing artificially a milder form of

## Inquisition

some contagious disease and thereby protecting the system against similar attacks in future. Such a process can be effective only in such diseases as attack us but once in the course of our lives, such, for instance, as smallpox. The term is chiefly used in connection with smallpox. See VACCINATION.

**Inquisition**, *in kwi zish'un*, THE, an ecclesiastical court in the Roman Catholic Church, officially known as the Holy Office, for the discovery and suppression of heresy. In the early ages of Christianity, civil as well as ecclesiastical government rigidly opposed all heresy. A person suspected or discovered to be guilty of heresy was liable to be arrested and detained in prison to await trial by the judges. The proceedings were usually conducted secretly. The suspect had the right to make known his enemies, whose evidence would be excluded, but a confession of guilt was sometimes extorted by torture, though such a confession, in order to be accepted, had to be repeated afterwards without torture. As a punishment, those convicted had to make pilgrimages, wear some badge, as the yellow cross, as a mark of disgrace, or be sentenced to imprisonment and, in extreme cases, to death (See HERETIC). The death penalty could, however, be inflicted only by the State and was resorted to in comparatively few cases. Thus, between 1308 and 1322 out of 636 persons convicted of heresy only 40 were condemned to death.

From the time of Constantine the doctrines of the Church were regarded as the basis of social order and the bulwark of thrones. Those who opposed them were therefore regarded as the enemies of both. A ruler was required to enforce the laws of the Church as part of his duty as a Christian. If he refused to do so, he might be excommunicated or even deposed. After the formation of the Nicene Creed, Constantine made strenuous efforts to suppress all dissent from the principles laid down therein. He punished the Donatists with fines and confiscation and caused the books of the Arians to be burned. His successors for several centuries coöperated with the bishops in discovering and punishing heresy. The measures resorted to were usually mild and yet quite effective. In the East, from 385, heresy was legally punishable by death, but this sentence was seldom delivered. In the twelfth and thirteenth centuries, the spread of certain heretical sects—as the Albigenses and Waldenses—roused the Church to a realization of the necessity of increased



## Insane Asylum

vigilance. Finally, a permanent court, confined chiefly to the Dominican order, was instituted, its duty being to deal with this branch of the work of the Church.

In Spain the Inquisition developed into an organization whose work is generally condemned by Protestants and Catholics alike. There are, however, those who are inclined to defend it and who hold that the facts have been grossly misrepresented in history. One concession must in all justice be made—that many of the cases tried by the Spanish Inquisition were not really heresies, but, rather, crimes such as would now be brought into the ordinary civil courts, and the punishments inflicted were probably in many cases just. An ordinary tribunal similar to those of other countries had existed in Spain from an early period. The rulers Ferdinand and Isabella, because of a Jewish plot to overthrow the government, obtained permission from the Pope to reorganize the Inquisition, reserving, however, the right of appointing the inquisitors and of controlling the entire action of the tribunal. In 1480 the Cortes sanctioned the institution, and the best authorities agree that from this time on the Spanish Inquisition became a State tribunal. Its work began in 1481 and was actively conducted until the latter part of the seventeenth century. A conservative estimate places the number of executions at 4000. The popes endeavored to mitigate the rigor of the Spanish court's proceedings, but were unable to accomplish much with the royal tribunal. Finally, in 1808, the Inquisition was suppressed, but under the Restoration it was revived. On the establishment of the Constitution, in 1820, it was again suppressed, but was not finally abolished until 1834.

In Rome and the Papal States the Church never ceased from the time of its establishment to exert a watchful control over heresy, punishing it with imprisonment and civil disabilities, but rarely, if ever, with death. Berger says there is no instance of death for heresy at Rome, and Archbishop Spalding says that it would be difficult to prove such an instance. The Congregation of the Holy Office still exists, but its chief concern now is with the suppression of heretical literature.

**Insane' Asy'lum**, an institution established for the treatment of insane persons. Many of these are public institutions, under the care of the state or county in which they are located; others are established by charitable persons

## Insanity

and given large endowments, while a third class consists of private institutions, in which patients are kept at fees proportionate to the accommodations and treatment they receive. But whether public or private, such institutions are now under control of the government and are frequently visited by officials, who see that the patients are kindly and properly treated. Formerly, the insane were considered as little better than wild beasts, and the hospitals were places of unmitigated cruelty, but now everything possible is done to make the patient's life pleasant; force is not used except when necessary, and the nurses and attendants are trained in their work. The result of such conditions has been manifest, not only in the increased comfort of the confined patients, but in the large numbers of cures that have been effected, even of cases that were long ago considered hopeless.

**Insan'ity**, a general term applied to every form of intellectual disorder, whether consisting of a total lack or loss of understanding, as in idiocy, or in the diseased state of one or several of the faculties. Medical writers have adopted different systems of classification, but perhaps the most convenient is that which includes all mental diseases under the four heads of mania, melancholy, dementia and idiocy. *Idiocy* is a defect of the intellectual faculties and may be present from birth or may be acquired by an injury to the brain, or from some other cause. *Dementia* is marked by a confusion of thoughts, loss of memory, childishness, diminution or loss of will power and general weak-mindedness. *Mania* is characterized by the disorder of one or several of the faculties or by blind impulses to acts of fury. *Melancholy*, or *melancholia*, consists in a depression of spirits; the mind is so occupied by dark forebodings that by degrees it becomes unable to judge rightly of existing facts, and the faculties become disturbed in their functions. Sometimes melancholy ceases of itself or is cured by medical aid, and in other instances it progresses to death. Not infrequently the patient is led to suicide.

The causes of insanity are numerous; the most common, as shown by the records of state hospitals for the insane, are loss of friends, business troubles, overwork, religious excitement, alcoholism and a great variety of physical causes arising from disease or vicious habits. There can be no sudden cure of insanity by the use of drugs, and the treatment of cases must vary according to the causes which produced

the malady. It is estimated that more than half of the cases of mania and melancholia recover, though certain other forms are never curable. In most of the states in the Union, provision is made for the cure of insane patients in well-appointed hospitals, where skilled attendants may give each sufferer the best attention. See INSANE ASYLUM.

**Insecticides**, *in sekt'i sidez*, and **Fungicides**, *fun'jy sidez*, preparations for destroying insects and fungi injurious to plants. The preparations for destroying insects are known as insecticides, and those for destroying fungi as fungicides. Sometimes the same preparation is suitable for both purposes.

**INSECTICIDES.** Insecticides need to deal with two classes of insects, those that live upon the outside of the plant, such as caterpillars, and those that live by sucking the sap of a plant, such as plant lice; preparations which are suitable for the first class of insects have no effect upon the second. Insects which feed upon the leaves or other plant tissues may be destroyed by some preparation containing arsenic. The most valuable of these are the following:

*Arsenic Solution.* This is prepared by adding to four ounces of Paris green two pounds of slaked lime and forty gallons of water. This makes a good solution for spraying.

*Kedzie Mixture.* This is prepared as follows: Boil two pounds of white arsenic with eight pounds of sal-soda (carbonate of soda) in about two gallons of water, until the arsenic is dissolved. Put this solution into a jug and keep it corked. It is a stock solution, to be used as needed. For spraying, slake two pounds of fresh lime. Add this and one pint of stock solution to forty gallons of water and mix thoroughly. The stock solution is intensely poisonous and should be labeled *poison* and kept in a secure place.

*Kerosene Emulsion.* This is the best mixture for the sucking insects. To prepare it, dissolve two pounds of hard soap in a gallon of boiling soft water, add two gallons of kerosene and mix thoroughly. For a strong solution add to this twenty-seven gallons of water. For a weak solution add forty-five gallons of water.

**FUNGICIDES.** Fungi can be divided into two classes, those that grow on the outside of a plant and those that grow on the inside and appear on the surface only when full-grown. The fungicide must be adapted to the nature of the growth. The following are the most useful preparations in destroying fungi.

*Sulphur.* This is a common fungicide of the hothouse. It is used by sprinkling it on a surface sufficiently warm to vaporize it. This deposits the fine sulphur powder or flowers of sulphur on the plants, and when the work is successfully done the results are satisfactory. Care should be taken not to ignite the sulphur, since gases from its burning will destroy the plants as well as the fungi.

*Bordeaux Mixture.* This is prepared as follows: Dissolve four pounds of copper sulphate (blue vitriol) in four gallons of water, by suspending the sulphate in a bag in the water. Slake four pounds of fresh lime in five gallons of water. Pour these solutions into thirty gallons of water and mix thoroughly. For delicate plants, such as peach trees and those having young foliage, an extra pound of lime and twenty-five gallons more of water should be added.

*Copper Carbonate Solution.* This is prepared by dissolving an ounce of copper carbonate in one pint of ammonia and adding ten gallons of water to the solution. This solution will not discolor foliage and is nearly as effective as the Bordeaux mixture.

Insecticides and fungicides should be applied with the greatest care. The work is most successful when the application is in the form of a spray. The apparatus required is a force pump and a hose having a nozzle constructed especially for the purpose. The spray should be so fine that it will touch all parts of the plant and moisten them, but will not throw a sufficient quantity of liquid to cause it to run down. In spraying tall trees, as apple trees, ladders are necessary. Plants should be sprayed when the condition indicates that the insect or fungus is making its appearance. These conditions must be determined by the orchardist; but he should observe one very important principle, which is, never spray while the blossoms are on the trees.

**In'sectiv'ora**, a comparatively unimportant order of Mammalia, none of which are large, and most of which are nocturnal in habit. Usually they walk on the soles of their feet, which, as a rule, have five toes. As the name indicates, they live largely on insects, though this is not exclusively true. See HEDGEHOG; MOLE; SHREW.

**In'sects** are the most numerous class of animals, belonging with the Crustaceans to the branch next to the vertebrates (See ARTHROPODA). They are called insects because the three divisions of the body, head, thorax and



abdomen, are always distinctly divided one from the other, in which respect they differ from the other classes of their branch. There are usually about eighteen segments, or rings, to each insect, though it is not often possible to see all of them. The head is usually composed of four segments, closely fused together; the thorax, of three segments, and the abdomen, of the remaining ones. There are never more than three pairs of legs in a perfect insect, and these are all borne upon the thorax. Each leg consists of from six to nine joints. Normally, two pairs of wings are present, but one or the other may be wanting. The wings are expansions of the sides of the second and third sections of the thorax and are attached by slender tubes. In the beetles the anterior pair of wings are hardened into protective cases, which cover the membranous posterior wings. The head carries a pair of feelers (See ANTENNAE), a pair of eyes, usually compound, and the appendages of the mouth. The latter are in two typical forms, one intended for chewing, as is shown in the beetle, and the other for suction, as is shown in the butterfly. The abdominal segments move easily one upon another, and at the extremity they are often armed with defensive organs. The insect breathes through pores along the sides of its body, and has a well-developed digestive tract, consisting of gullet, crop, gizzard, stomach and intestine. The colorless or greenish blood runs through the body, but not in a regular system of blood vessels. The sensitive nervous system is composed of a series of knots or ganglia, placed along the lower side of the body and connected by a set of double nerve cords.

Insects are produced from eggs. When these hatch, the little animals usually show no resemblance to the insect that laid the eggs. In this, their first state, they are called caterpillars or worms, or, more accurately still, *larvae*. Of course they are not worms in the sense in which the zoölogist uses that word. They live for some time as larvae, eating heartily and shedding their tough skins whenever they become too confining. When the larva is full-grown, it goes into a quiet, resting state, unlike either caterpillar or perfect insect. In this form it is called a *pupa*, which in some species is enclosed in a silk cocoon (See SILK). After resting a time in this condition, the insect emerges from the pupa as an *imago*, that is, the fully perfected form in which eggs are laid for another cycle of life. These three changes constitute what is

known as a complete metamorphosis. Not all insects pass through these three stages. The grasshopper, for instance, can be recognized as a grasshopper as soon as it comes out of the egg. Insects have been divided into three sections, according as they undergo no metamorphosis, an incomplete one or a complete one.

Insects play a great and important part in the economy of the world, and while some are destructive, others are of great value to mankind. Many are surpassingly beautiful; some show remarkable phases of intelligence, and all are interesting subjects for study. In their infinite numbers, insects are found in nearly every part of the world, feeding upon plants and animals, living and dead; sucking the juices and consuming the tissues, and preying upon almost every conceivable fabric of vegetable or animal origin. To learn more of their appearance and habits, their value or destructiveness the reader should consult the numerous special articles, such as those on bee, cochineal, silkworm, ant, butterfly, army worm and chinch bug.

CLASSIFICATION. A perfect classification of insects has not yet been established, although there are now generally recognized nineteen independent groups, which have been made from the seven that constituted the classification of Linnaeus. The latter is still used to so great an extent that it is given here:

I. The *Neuroptera*, an order that has been broken up by the newer classification into ten different families, three of which are placed much higher in the list. Dragon flies are good examples of the *Neuroptera*. See NEUROPTERA.

II. The *Orthoptera*, divided by later entomologists into two families, have four wings, the hinder ones being flattened lengthwise and laid straight along the body when the insect is not flying. Crickets, cockroaches and grasshoppers are good examples. See ORTHOPTERA.

III. The *Hemiptera*, now considered to be composed of two families, have four wings or none at all. All this class have their mouths armed for piercing and sucking the juice of plants or blood of animals. See HEMIPTERA.

IV. The *Coleoptera* are the beetles. They have four wings, the outer pair being hardened, apparently for protection. See BEETLE.

V. The *Diptera* are the two-winged insects. Entomologists now make two families of this order. See FLY; MOSQUITO.

VI. The *Lepidoptera* are the moths and

## Insignia

butterflies. Their wings are covered with minute hairs or scales, and their mouths are adapted to sucking. Their larvae are generally injurious to vegetation. See ARMY WORM, BUTTERFLY; MOTH.

VII. The *Hymenoptera* are the gauze-winged insects. The mouth is formed for biting and sucking and the abdomen of the female is usually armed with a sting or saw. See ANT; BEE. Consult Howard's *The Insect Book*; Comstock's *Manual for the Study of Insects*, and Packard's *Guide to the Study of Insects*.

**Insig'nia**, distinguishing marks of authority, office or honor, such as the crown and scepter of a king, the shield and helmet of a knight, the banner of a warrior and the tiara and ring of a pope. Typical and characteristic signs by which the members of any trade, profession or society, or of any civil, military or religious order are distinguished, are also known as its insignia. Of especial importance are the military insignia, which are badges or devices to distinguish the various corps, arms, ranks and grades of military and naval service.

**EARLY MILITARY INSIGNIA.** Strictly speaking, the use of the military insignia dates back to ancient times, when troops were distinguished by the devices on their banners and shields; but in the modern accepted sense of the term the military insignia include only the characteristic devices on the uniforms. Such devices, so far as is known, were first used in the Second Crusade, when, to avoid confusion, the French wore a red cross and the English a white cross on the sleeve.

**MODERN EUROPEAN MILITARY INSIGNIA.** Time has wrought notable changes in everything pertaining to the equipment of soldiers. While alterations in uniforms has been most important (see UNIFORM), distinguishing marks of rank have also changed to less conspicuous designs. Formerly large, fringed epaulets were worn conspicuously on the shoulders of officers, rendering them in their bright-colored clothing excellent marks for the enemy. All nations now dress their soldiers in what might be termed protective coloration. Marks of rank are worn on small and narrow cloth shoulder-straps of the same material as the uniform. The only exception to this rule are certain badges, mottoes or other devices employed by famous regiments to commemorate valorous incidents in their history. For example, until 1914 the sphinx of Egypt was worn by members of thirty regiments whose predecessors served in the Egyptian

## Insignia

UNITED  
ARMY

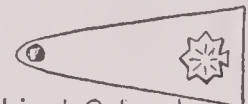


STATES  
INSIGNIA

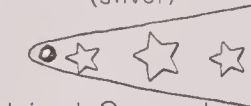
### OFFICERS' SHOULDER STRAPS



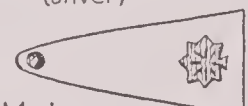
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(silver)



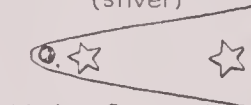
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(silver)



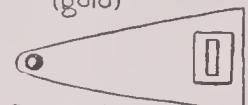
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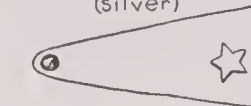
Major  
(gold)



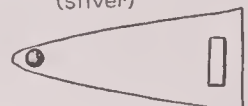
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(silver)



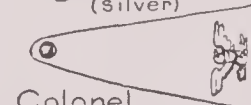
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(silver)



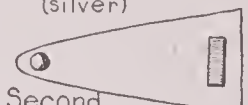
Brigadier-General  
(silver)



First Lieutenant  
(silver)



Colonel  
(silver)



Second  
Lieutenant (gold)



First Sergeant

### CHEVRONS

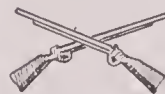


Sergeant



Lance Corporal

### COLLAR DEVICES



Infantry



Cavalry



Field Artillery



Coast Artillery



Engineers



Medical



Dental



Signal Corps



Aviation



Ordnance



Quartermaster



Veterinary



General Staff



Chaplain



## Insignia

campaign against the French. It is permissible, also, for a soldier to wear whatever medals of honor he may earn by exceptional bravery on the field of battle.

**UNITED STATES INSIGNIA.** During the Revolutionary War American soldiers in their uniforms and insignia copied European customs, and these were retained in the War of 1812 and the Mexican War. Many modifications had been effected by 1861, and during the Civil War the most conspicuous insignia had disappeared.

Extremely modest insignia were employed by the time the United States entered the world war in 1917. Of special interest are the distinguishing marks of the various arms of the service. The accompanying illustration shows the designs, made of gunmetal and worn on the collar, for the leading branches of the army.

Officers may wear the regulation cap or the service hat. The branch of the army in which a soldier serves is indicated by his hat cord.

In the *United States Navy* the following insignia are worn:

1. *Insignia of all naval officers and cadets.* Attached to the front of the cap is a device consisting of a silver shield divided by thirteen upright stripes and with its chief, or upper part, strewn with stars, surmounted by a silver spread eagle, the whole placed upon two crossed anchors in gold.

2. *Insignia of rank.* Rank is indicated by the strips of lace or braid on the sleeve and by the devices on the collar, shoulder marks, shoulder straps and epaulets. The sleeve of an admiral has two strips of two-inch gold lace, with one strip of one-inch gold lace between; a rear admiral, one strip of two-inch gold lace, with one strip of half-inch gold lace above it; a captain, four strips of half-inch gold lace; a commander, three strips of half-inch gold lace; a lieutenant commander, two strips of half-inch gold lace, with one strip of quarter-inch gold lace between; a lieutenant, two strips of half-inch gold lace; a lieutenant (junior grade), one strip of half-inch gold lace, with one strip of quarter-inch gold lace above; an ensign, one strip of half-inch gold lace; staff officers, the same as for line officers with whom they rank, except that bands of colored cloth are placed between the strips of lace; naval cadet, one strip of quarter-inch gold lace; chaplain, lustrous black braid of the same size and disposition as for line officers of the same rank. The

## Instinct

device on the collar, shoulder marks and epaulets is the same for each rank as that on the shoulder straps. See **UNIFORM**.

**Insol'vency**, in law, the status of any person who is unable to pay his debts. In the United States the term is used commonly in distinction to bankruptcy, an insolvent person being unable to pay all of his debts and a bankrupt person being unable to pay any considerable part of them. Insolvency and bankruptcy are both regulated by both Federal and state laws, of which the latest was the Federal statute of 1898. See **BANKRUPT**.

**Insom'nia** or **Sleeplessness**, a condition caused by excitement, exhaustion, intoxication, grief or any other emotional disorder. The best treatment consists in removing the cause, and change of environment, frequent rests, plenty of fresh air, hot baths and massage are often helpful. See **SLEEP**.

**Inspiration**, *in'spir a'shun*, in theology, the infusion of ideas into the human mind by the Holy Spirit. By the inspiration of the Scriptures is meant the influence of the Holy Spirit exercised on the understanding, imagination, memory and other mental faculties of the writers, by means of which they were qualified for communicating to the world divine revelation, or the knowledge of the will of God.

**In'stinct**, the innate power which compels an animal to perform certain acts without having a knowledge of the purpose of the act or without a conscious connection between the act and its purpose. In the lowest animals, such as mollusks and worms, instinct is nothing more than reflex action. In the higher animals, as birds and most mammals, it verges so closely upon intelligence that it is difficult to find a dividing line between them. Instincts are closely related to the preservation of the individual, as the instinct of taking food, common to all young animals, and the instinct of fleeing from danger, or of reproduction, as in nest-building and the sitting of the bird to hatch the eggs. It is also closely allied with the feelings. Undoubtedly, laughter, weeping, anger and some other emotions are instinctive.

Instinct differs from intelligence in that it does not gain by experience. The robin builds its first nest as well as its fifth, and the young eagle seizes its prey as skilfully as the old one. Among the higher animals there are some apparent exceptions to this rule. An old fox is liable to be more cunning than a young one, and the dog and horse undoubtedly gain in

## Institute of France

intelligence as they gain in years. Some instincts are destroyed by removing for several generations the necessity for them. Canary birds that have been reared in a cage from one generation to another lose the nesting instinct. Man is guided by intelligence rather than instinct, but he is subject to some instinctive movements, such as the taking of food by the infant and certain inherent mental tendencies. These are usually due to heredity and can be suppressed or modified by training.

**In'stitute of France**, a name given to several learned societies united into one body under the patronage of the French government. At present these societies are the following:

(1) The French Academy, organized by Cardinal Richelieu in 1635, devoted to literature. Its members are often called the *Forty Immortals*. They have in their hands the distribution of many valuable prizes for literary excellence.

(2) The Academy of Inscriptions, founded in 1663, devoted to the study of antiquities, inscriptions and ancient and oriental languages.

(3) The Academy of Sciences, founded in 1666, for the promotion of mathematics, physics, astronomy and other sciences.

(4) The Academy of Fine Arts, founded in 1648, devoted to music, painting, sculpture and architecture.

(5) The Academy of Moral and Political Science, founded in 1795, suppressed in 1803, but restored in 1832, given to the discussion of psychology, history, finance, law and political economy.

Each has a fostering care over some art or science, and promotes its interests by prizes for excellence and in other ways. Members receive a small salary. Each Academy has its own officers and its own funds, while the collections and libraries are in common. The general fund is in charge of a committee of two from each Academy, acting with the minister of public education as chairman.

**In'stitu'tional Church**, a name given to a church or organization which emphasizes activity and actual accomplishments in social and individual progress, mentally, physically and morally, as well as spiritually, in distinction to the ritualistic church, which lays emphasis upon beliefs, forms and sacraments. Since 1890 the development of institutional church work in the United States has been very rapid, being promoted by the same influences which led to the extension of university settlements, the Salvation Army and similar philanthropic

## Insurance

enterprises—namely, the belief that the churches were not accomplishing their mission with the masses of the people. An institutional church is usually managed through a highly specialized committee system. It calls for the personal effort of the laity of the church, as well as of the leaders, and it extends its activities to include educational, social and physical work, as well as religious. Lectures, classes, clubs, libraries, games, gymnasiums, natatoriums, athletics, employment bureaus, dispensaries and hospitals are all adjuncts of the modern institutional church. Probably the most famous of the institutional churches of the United States are the Berkeley Temple of Boston, the Judson Memorial of New York, the People's Palace of Jersey City, the Plymouth Church of Indianapolis, the Tabernacle of Denver and All Souls' Church, or Lincoln Center, of Chicago. These and many others are organized into an Open and Institutional Church League, which had its beginning in New York in 1894.

**In'strumen'tal Music**, music produced by instruments, as distinguished from *vocal music* (See SINGING). The art of arranging the parts of a composition for orchestra is known as *instrumentation*. It is of rather recent origin, even Bach and Handel having but primitive ideas upon the subject. The importance of a thorough knowledge of instrumentation is manifest, for a chord which, sounded by some instruments, would produce exquisite harmony, sounded by others would be discordant. The greatest masters of instrumentation have been Haydn, Mozart, Beethoven, Weber and Wagner. The art is also called *orchestration*. See ORCHESTRA.

**In'sula'tor**, a body which is used to separate an electrified conductor from other bodies, and which offers great resistance to the passage of electricity. Glass, shellac, resins, sulphur, ebonite, gutta-percha, silk and baked wood are notable insulating materials. A glass cone is the usual form of insulators in telegraph lines, being used at the points where the wires are supported on the posts. Insulators for this purpose are also made of porcelain (See ELECTRICITY).

**Insurance**, *in shoor'ans*, in law, "a contract by which one party, for an agreed consideration (which is proportional to the risk involved), undertakes to compensate the other for loss on a specified thing, from specified causes. The party agreeing to make the compensation is usually called the *insurer* or *underwriter*; the other, the *insured* or *assured*; the agreed con-



sideration, the *premium*; the written contract, a *policy*; the events insured against, *risks* or *perils*, and the subject, right or interest to be protected, the *insurable interest*." If the risk is fire, the system of insurance is known as *fire insurance*; if the risk is connected with navigation by sea, the insurance is known as *marine insurance*; if it is accident of any kind, explosion, breakage, destruction or the loss of future earnings, it is *accident insurance*; if the event is death, the insurance is called *life insurance*.

Insurance companies are of two kinds, *proprietary* or *stock* companies, which have a certain capital stock and which establish such rates or premiums as not only will cover expected losses, but will provide a reasonable profit or interest upon the capital invested; and *mutual* companies, in which the policy-holders are also the stockholders, and the rates or premiums are fixed at just that amount which will pay for the losses to be incurred and for the management of the company, the profits, if any, being returned to the policy-holders in dividends. Familiar examples of this kind of insurance companies are the so-called "friendly societies" or "fraternal societies," such as the Odd Fellows or the Modern Woodmen of America. Some of the largest insurance companies in the world, however, besides the fraternal societies, are also organized on this basis.

**FIRE INSURANCE.** In fire insurance the contract by which insurance is undertaken establishes certain rights and duties upon each party. These are usually expressed in the policy, but sometimes are only implied, but in either case will be recognized in court. The underwriter promises to indemnify the insured to a certain specified extent, and thereby guarantees that the insurance company will endure as long as the contract of insurance runs; that the risks which it undertakes shall be selected with careful regard to quality, quantity and exposure; that the premiums charged shall be adequate to afford a profit which shall make the insurance doubly secure, and that its funds shall be guarded against wasteful or dishonest expenditure or investment. The insured, in signing his application, answers a series of questions, and if at the time of loss it can be shown that he has misrepresented or untruthfully answered any of these questions he is entitled to no indemnity. It is customary for insurance companies to classify the risks against which they insure in certain orders, known as ordinary, hazardous and extra-hazardous, the rates

charged being apportioned accordingly. It is especially important that the insured state truly the class under which his property should fall. Repairs and alterations on the premises insured, if they do not affect the character of the risk, do not invalidate the policy, but the insurance companies should usually be notified of such changes. Courts generally are inclined to construe insurance policies liberally on behalf of the insured, and unless fraud can be shown, damage resulting from fire, even though due in part, and in some cases in whole, to the negligence of the insured or his servants, must be indemnified by the insurance company. It is customary for insurers to stipulate that they may rebuild or repair the premises if they choose, instead of paying for the loss. It has recently become the rule in both England and America that heat alone does not create liability on the part of the insurers unless there be actual fire; so a loss by lightning is not held to be a loss by fire unless the property be destroyed by flames occasioned by the lightning. On the other hand, loss occasioned by direct efforts to put out a fire, as by water, or a loss sustained by removing insured goods from the peril of fire or of tearing down or blowing up a structure to stop the progress of a conflagration, would fall on the insurers, provided the steps taken were reasonable and necessary. Marine insurance is largely governed by the same principles as fire insurance, with such modifications as the nature of the property and of the risks necessitates. The same is true in regard to accident insurance.

**LIFE INSURANCE.** Life insurance originated in the desire of a man to provide for a helpless or dependent family after his death. It has now, however, entered the field of investment, and policies are written whose main object is the safe-keeping and increase of funds. Three classes of policies are most common in the United States, those known as *life*, or *straight life*, policies, *endowment* policies and *tontine* policies. Each of these classes has been varied in innumerable ways, in order to meet the demands of different classes of persons. For instance, in taking out a life policy the person may agree to pay a certain amount annually as long as he lives, the company agreeing to pay a certain amount at his death to his heirs or to some specified beneficiary. He may make annual payments for a term of years, as ten, fifteen or twenty, and then pay no more, the company promising that at his death a certain amount

## Insurance

shall be paid to his heirs or beneficiaries. Or he may pay a certain amount once for all, with the understanding that at his death a certain amount will be paid to his heirs or beneficiaries. In the endowment policy the insurance company agrees to pay at the end of a certain term if the insured is alive, or before that, in case of his death, a certain amount. In both classes of policies the premiums are determined on the same basis, that is, the insured pays enough each year to the company, so that at the end of the given time the accumulation of his premiums and of a low rate of interest upon them will equal a certain amount, which the insurance company then agrees to pay to his beneficiaries. Life insurance upon either of these plans is therefore exactly opposite to the principle governing the payment of annuities (See ANNUITY). The premium to be paid either upon life policies or upon an endowment policy is regulated in accordance with a mortality or insurance table, compiled from the experience of many companies in accordance with the law of probabilities and the law of averages (See MORTALITY, LAW OF). In accordance with this table the company can determine approximately what proportion of persons insured at a given age will die each year until the whole number have died, that is, they can determine the average number of years that persons at a given age will live. Therefore, if the company agrees to pay a certain amount at a certain person's death, it will fix the premium which that person shall pay annually until his death at such an amount that if he died at the time that the average person of his age will die, he will have paid to the company enough, with the accrued interest, to equal the sum which his beneficiary will receive. The tontine policy differs from both of these, and may be of either of two kinds. According to one system, if the insured allows his policy to lapse, he forfeits whatever he has paid in, the profits on his investment accruing to the others of the same class. By the later, or *semi-tontine*, plan, certain extraordinary profits, not taken into consideration at the time of the writing of the policy, are allowed to accumulate throughout the term of the policy, ten, fifteen or twenty years, and at that time are divided among the persons of the same class whose policies are still in force.

**HISTORY.** Insurance is many centuries old, being recognized in English statutes as early as 1600. Its oldest form is marine insurance; its latest, fidelity insurance, that is, insuring an

## Interest

employer against the defalcation of his employes, or burglary insurance, against robbery. In recent years, the vast growth in the power and influence of insurance companies, through the concentration of funds in their hands, has led to searching investigations of their methods, and this, in turn, to more rigid governmental control over their activities.

**In'terest**, in political economy, the increase of capital used in production; in common speech, the allowance made for the loan or retention of a sum of money which is lent for, or becomes due at, a certain time, this allowance being generally estimated by per cent per annum, that is, by the year. The money lent is called the *principal*; the ratio of the interest for one year to the principal is the *rate*, and the sum of any principal and its interest together is the *amount*. Interest is either simple or compound. *Simple interest* is that which is allowed upon the principal only, for the whole time of the loan. *Compound interest* is that which arises from increasing the principal at fixed periods by the interest then due, and from that time forward till the end of the next period, obtaining interest upon this amount. The ordinary rate of interest, supposing the security for the principal to be equal, depends obviously upon what may be made on the average by the employment of money in various industrial undertakings.

**Interest**, in psychology, the feeling of satisfaction or dissatisfaction which one has towards a subject, or that bent of mind which causes one to contemplate certain subjects with pleasure and to have an aversion for others. Interest is a phase of feeling and differs from desire in that in interest the mind is satisfied with contemplating the subject, while desire is not satisfied until possession is obtained. Interest may be pleasurable or painful, according to the nature of the subject by which it is aroused. Contemplation of the same subject may be painful to one and pleasurable to another. In contemplating a surgical operation which a friend must undergo, one may be sorrowful because of the pain and risk that the patient must suffer, while the surgeon, contemplating the same operation, derives pleasure from considering the skill which makes the operation and its consequent benefits possible.

Interest is the foundation of knowledge, since without it prolonged attention is impossible. The child voluntarily directs his attention only to those things which he feels can supply his wants.



## Interior

and it is from these that he gains his early store of knowledge. He is interested in whatever supplies his bodily needs, appeals to his love of the beautiful and satisfies his affections. Interest is most easily aroused in those objects of which we have some knowledge. Mere novelty, as a strange sound or an unusual color, will attract the child for a moment; but it does not serve to hold his attention, because he is unable to place it satisfactorily in his store of ideas, while a color that he has before seen, a tone with which he is familiar, appeal to him because of their association with the ideas already in the mind. This principle should be borne in mind in selecting subjects upon which to give instruction to children in primary grades. The theory that children will be interested in any subject if it is properly presented is fallacious, because there are many subjects which are of such nature that they cannot appeal to the immature mind of the child.

Interest is closely related to volition, and children's activities are largely directed by their interests. All children take interest in something. "The most careless and inattentive boy in school is not without interest, not even without attention. The trouble is he is interested in wrong things." Parents and teachers can do much in directing the child's interest by seeing that he is surrounded by proper associations. See, in the order named, ATTENTION; PERCEPTION; APPERCEPTION; WILL.

**Inte'rior**, DEPARTMENT OF THE, one of the nine executive departments of the United States government, organized by act of Congress in 1849. It is under the direction of a secretary of the interior, who is a member of the president's cabinet, being seventh in line of succession to the presidency. The department has supervision of indian affairs, public lands, pensions, patents, the geological survey, education, public documents, railways subsidized by the Federal government, territories, national parks and reservations and certain institutions in the District of Columbia. Each of these bureaus is presided over by a commissioner, appointed by the president and confirmed by the Senate, but responsible to the head of the department. See UNITED STATES, subhead *Government*.

**In'terjec'tion**, in grammar, the part of speech used to express sudden, strong feeling.

**Interlaken**, *in'tur lah'ken*, a village in Switzerland, 26 mi. s. e. of Berne, beautifully situated near the left bank of the Aar, between the lakes

## International Law

of Thun and Brienz. Its beautiful scenery and healthful climate make it a popular resort. Population in 1910, 3700.

**Intermezzo**, *in'tur met'so*, in dramatic literature, a short musical piece, generally of a light, sparkling character, played between the parts of a more important work, such as an opera or drama.

**Internal Rev'enue System**. See EXCISE TAX.

**International Date Line**, an irregular imaginary line, drawn through the Pacific Ocean in the vicinity of the meridian 180° of longitude, to mark the place where navigators in crossing the Pacific change their dates. If a person is traveling westward, for every fifteen degrees of longitude which he travels, the length of his day is increased by one hour, since he is traveling with the sun. In going the whole distance around the earth westwardly, he will lose one day; that is, upon arriving at the starting point, Sunday, according to his reckoning, will be Monday to those who have remained there during his absence. If he should travel around the earth in the opposite direction he will gain one day. Therefore, if two persons starting from the same place travel around the earth in opposite directions, when they meet at the place of starting, they will differ by two days in their reckoning of time. Hence the necessity for having a *date line*, at which ships passing in both directions change their dates in order to come into agreement with each other. The meridian of 180° of longitude is chosen for this purpose because it is at the farthest possible distance from civilization and a change at that point will therefore cause the least inconvenience. The date line, however, does not coincide exactly with this meridian, since it is drawn so as to avoid a change between important islands of the same group. In fact the line is not drawn exactly the same by different makers. See, also, ARITHMETIC, Volume V.

**International Law**, the law of nations; those rules or maxims which independent political societies or states observe, or ought to observe, in their conduct toward one another. International law is divisible into two parts, that which regulates the rights, intercourse and obligations of nations, as such, with one another; and that which regulates the rights and obligations more immediately belonging to their respective subjects. Thus, the rights and duties of ambassadors belong to that head which respects the nation in its sovereign capac-

ity; and the rights of the subjects of one nation to property situated within the territory of another nation, belong to the latter head. Some of the maxims regarding the rights and duties of nations during a state of peace are: (1) Every nation is bound to abstain from all interference with the domains of other nations. (2) All nations have equal and common rights on the high seas, and they are not bound to admit any superiority there. The sea which washes the coast of a nation is, to the extent of three miles from shore, now deemed to be a part of the territory of the nation, over which it may exercise an exclusive jurisdiction. And, in respect to persons subjected to its laws, every nation now claims a right to exercise jurisdiction on the high seas, for the purpose of enforcing both international law and its own municipal regulations. (3) No nation has a right to pursue any criminal or fugitive from justice in a foreign country; its claim, if any, is a mere right to demand him from the nation in which he has taken refuge. (4) Every nation has a right to regulate its own intercourse and commerce with other nations. (5) Foreigners are bound to obey the laws of a country as long as they reside within it and under its protection; and the property held by foreigners within a country ought to be protected in the same manner as that of natives. (6) Every nation has a right to send and to receive ambassadors and other public ministers; the persons of such ministers are held sacred and inviolable, and their property, servants and retinue enjoy a like privilege.

War introduces an entirely new order of rules. The right of declaring war results from the right of a nation to preserve its own existence, its own liberties and its own essential interests. In a state of nature men have a right to employ force in self-defense, and when they enter into society this right is transferred to the government and is an incident to sovereignty. What are just causes for entering into a war is a question which has been much discussed by publicists. Defensive wars are necessarily justifiable, from the fact that they involve the existence or safety of the nation and its interests. But offensive wars are of a very different character and can be justified only in cases of aggravated wrongs or vital injuries. The first effect of a declaration of war is to put the subjects of one nation into a state of hostility to those of the other nation. The property belonging to one is deemed hostile by the other. If it be personal property it may be captured as a prize; if lands, they may

be seized and confiscated at the pleasure of the sovereign; if it be merely in debts or stock it may, in the extreme exercise of the laws of war, be equally liable to confiscation. As soon as a battle is over, the conquerors are bound to treat the wounded with kindness and the prisoners with a decent humanity. And there are some things which seem positively prohibited, from their cruelty and brutal barbarity; such are the torturing of prisoners, the poisoning of wells, the use of inhuman instruments of war. In time of war there is occasionally intercourse between the belligerents, which should be held sacred. Such intercourse includes the interchange of prisoners, the temporary suspension of hostilities, the passage of flags of truce, the engaging in treaties of capitulation. When any conquest of territory is made, the inhabitants pass under the dominion of the conqueror and are subject to such laws as he chooses to impose upon them. There are also certain rights which war confers on the belligerents in respect to neutrals. Thus, they have a right to blockade the ports or besiege the cities of their enemies and to interdict all trade by neutrals with them. But no blockade is to be recognized unless "the besieging force can apply its power to every point in the blockaded state." Belligerents have a right also to insist that neutrals shall conduct themselves with good faith and abstain from all interference in the contest by supplying their enemy with things contraband of war. And hence arises the incidental right of search of ships on the high seas for the detection of contraband goods. A neutral nation is bound to observe entire impartiality between the belligerents. Neutral nations are, strictly speaking, bound to compel their subjects to abstain from every interference in the war, as by carrying contraband goods, serving in the hostile army or furnishing supplies. Subject to the exceptions above referred to, a neutral has a right to insist upon carrying on its ordinary commerce with each of the belligerents in the same manner as in times of peace. See TREATY; WAR; NEUTRALITY.

**International Peace Conference.** See PEACE CONFERENCE, INTERNATIONAL.

**Interstate Commerce Act,** a popular name for a law passed by the United States Congress in 1887 to regulate commerce between the states. It grew out of the rapid development of railways and the abuses which arose from their sharp competition. Under the law all common carriers, either by rail or water, are



prohibited from granting unreasonable preferences to individuals or localities; from agreeing to pool the traffic (See TRUSTS) and to divide the profits; from concealing any rates, or from changing them without due notice. A commission of five members was created to hear complaints, make investigations of violations of the law and require reports from carriers. The law has accomplished much good in making public the policies of the railways, and in correcting some abuses, but it has failed to accomplish all the good desired, and a serious agitation in favor of an increase of the power of this commission resulted, in 1906, in the passage of a law giving to the commission the right to set aside unreasonable rates and to declare what is a reasonable rate, after consideration of all the circumstances and conditions.

**Intestacy**, *in tes'ta sy*, in law, the condition of a person who dies without having left any will, or who leaves one not legally valid or such a one that nobody becomes heir under it. In that case the property is disposed of according to a rule fixed by law. In the case of a person dying partially intestate, that is, without disposing of *all* his property, the property not included in the settlement goes to the next of kin or to the heir-at-law, according as it is real or personal. See WILL; PERSONAL PROPERTY; REAL PROPERTY.

**Intes'tines**, the name given to the membranous tubes which receive the food from the stomach through the pyloric orifice, retain it for a longer or shorter time, mix it with the bile, pancreatic juice and intestinal secretions and give rise to the lacteal or absorbent vessels which take up the chyle and convey it into the current of the blood. The small intestine includes the duodenum, jejunum and ileum and averages about 23 feet in length. The large intestine includes the colon, caecum and rectum and extends nearly around the small intestine. The vermiform appendix is attached to the caecum. The four coats of the intestine are serous, muscular, areolar or submucous, and mucous, the latter in the small intestine being covered with tiny projections, called villi, each of which contains a lacteal, a vein and an artery. This coat is also laid in numerous folds, which serve to delay the food in its passage, to give a large surface for secretion and absorption and to mingle the food lying between them with the secretions. The large intestine contains no villi in the mucous coat. See LACTEALS.

**Intox'ica'tion**, the state produced by the excessive use of alcoholic liquids and also of opium, chloral or belladonna. In the first stage the circulation of the blood becomes somewhat more rapid, and all the functions of the body and the mind are exercised with more freedom. In the second stage the effect on the brain is more decided. The peculiarities of character and the faults of temperament manifest themselves without reserve; the secret thoughts are disclosed, and the sense of propriety is lost. In the next stage consciousness is still more weakened; the ideas lose their connection; dizziness, double vision and other discomforts arise, until, finally, the excitement partakes of the nature of delirium and is followed by a more or less prolonged stupor, often by dangerous coma. In cases of extreme intoxication the stomach-pump should be employed, if ordinary emetics fail to overcome the inactivity of the stomach.

**Invalides**, *aN va leed'*, HOTEL DES, a splendid hospital for disabled soldiers at Paris, in the suburb of Saint Germain, erected by Louis XIV, between 1670 and 1673. A soldier must have served ten years to be received into this hospital on account of poverty or infirmity. In vaults under the dome lie the bodies of Napoleon I, Turenne and several other great French commanders.

**Inverness'**, a town in Scotland, capital of the county of the same name, the chief town in the Highlands. The principal buildings are the cathedral, the Royal Academy, the county hall and an infirmary. The industries include ship-building, rope making, tanning, distilling and brewing, and there is a considerable trade, the city having regular communication by sea and canal with Glasgow, Liverpool, Aberdeen and Leith. The city is very old and was once the capital of the Pictish kingdom. Population in 1911, 23,000.

**Inver'tebra'ta**, a collective term for the six great lower divisions of the animal kingdom, all of which agree in not having a vertebral column, or backbone. It was a term used by Cuvier to include the divisions Radiata, Articulata and Mollusca, which, however, have been changed in the more recent classification. See ZOOLOGY.

**Inves'titure**, in the feudal law, the open delivery of a fee (See FEE) or fief by a lord to his vassal, thus, by external proof, affording evidence of possession; or the formal introduction of a person into some office or dignity. Investiture was often performed by the presentation of some symbol to the person invested, as a branch of a tree. The investiture of persons with eccle-

## Involution

siastical offices or dignities is historically the most important phase of the institution. The estates and honors which gave the Church its temporal influence were considered to partake of the nature of fiefs and therefore to require investments from the lord. In the time of Emperor Henry IV of the Holy Roman Empire, a bitter struggle broke out between the Church and the Empire, the former declaring that a temporal prince could not invest an ecclesiastical officer. The contest ended in 1122, at the Concordat of Worms, in a compromise.

**In'volu'tion.** See POWER, in mathematics.

**I'o**, in Greek mythology, the daughter of Inachus, beloved by Jupiter, who, to protect her from the jealousy of Juno, changed her into a beautiful white heifer. She was given into the care of the hundred-eyed Argus, from whom she was rescued by Mercury.

**Iodine**, *i'o din* or *i'o deen*, a peculiar elementary solid substance, which exists in the water of the ocean and mineral springs, in marine mollusks and in seaweeds, from the ashes of which it is chiefly procured. It exists in certain plants and minerals and is found in the water of some rivers. The chief commercial source is from kelp, and Glasgow and the west coast of Scotland produce the largest quantities. At the ordinary temperature of the atmosphere iodine is a solid crystalline body. Its vapor is of an exceedingly rich violet color, a character to which it owes its name. Iodine has an extremely acrid taste, and its odor resembles that of chlorine. It is an irritant poison, but in small doses it has been of great service in certain forms of glandular disease. It is largely used in photography, in the preparation of aniline colors and in other ways. The great consumption of iodine is in medicine, where it is sometimes employed in its pure state, but much more frequently in the form of compounds, such as iodide of potassium, which has been found of great benefit in goiter, scrofula, rheumatism and other diseases, as well as in cases of lead poisoning. Iodine is not usually given internally, but as a disinfectant and destroyer of parasites it is freely used externally. It belongs to the halogen group of elements.

**Iod'oform**, a substance similar to chloroform in composition, except that iodine occupies the place of chlorine. It is in the form of small, solid, yellow crystals and is prepared by the action of alcohol and other bodies on iodine and potash. It is nearly insoluble in water, but it dissolves in ether, oils and alcohol. It is used

## Ionian Islands

in medicine as an antiseptic and has some power to deaden pain. It is successfully applied to ulcers and sores of various kinds and is used as a snuff for cold in the head, but its disagreeable odor prevents its general use except when really necessary. It may be prepared as an ointment.

**Io'la**, KAN., the county-seat of Allen co., 110 mi. s. w. of Kansas City, on the Neosho River and on the Missouri Pacific, the Atchison, Topeka & Santa Fé and other railroads. The city has a large wholesale trade in grain and groceries with the surrounding country. The industries include cement works, foundries and machine shops and large zinc smelters and rolling mills. The place was settled in 1857, was chartered as a city in 1898 and has been growing very rapidly since the recent discovery of an abundance of natural gas. Population in 1910, 9032.

**Io'nia**, that part of the seaboard of Asia Minor which was inhabited by Ionian Greeks, a beautiful and fertile country opposite the islands of Samos and Chios, which also belonged to it. According to tradition the Greek colonists came over from Attica about the middle of the eleventh century B. C. and founded twelve towns, which, though mutually independent, formed a confederacy for common purposes. Commerce, navigation and agriculture early rendered them wealthy and flourishing, but the country was made tributary by Croesus, king of Lydia, and later by Cyrus, king of Persia. With an interval of independence the cities remained under Persia until this empire was overthrown by Alexander the Great, when they became a part of the Macedonian Empire. Ionia, at a later period, became part of the Roman province of Asia. It was afterward totally devastated by the Saracens, so that few vestiges of its ancient civilization remain.

**Ionias**, MICH., the county-seat of Ionia co., 34 mi. e. of Grand Rapids, on the Grand River and on the Grand Trunk and the Pere Marquette railroads. The city is in the southern and agricultural section of the state, has lumbering interests and contains wagon works, car shops and manufactories of clothing and other articles. The state house of correction and a state asylum are located here. The place was laid out in 1833 and was incorporated in 1873. Population in 1910, 5030.

**Io'nian Islands**, a number of Greek islands in the Ionian Sea, extending along the western and southern shores of Greece, of which the largest are Corfu, Cephalonia, Zante, Leucas and Cerigo, others being Ithaca, Paxos and Santa Maura. The surface is mountainous, but there



are fertile plains in some of the islands. The staple exports are oil, currants, valonia, wine, soap and salt, and the few manufactures are chiefly textile and ornamental. These islands belonged to Venice from the Middle Ages to the nineteenth century, and in 1814 they came under the protection of Great Britain. They were annexed to Greece in 1864. Population, 270,000.

**Ionians.** See GREECE; IONIA.

**Ionian Sea,** the ancient name of that part of the Mediterranean which lies between the south part of Italy and Greece.

**Ion'ic Order.** See COLUMN.

**I'owa,** the HAWKEYE STATE, one of the central states, bounded on the n. by Minnesota, on the e. by Wisconsin and Illinois, on the s. by Missouri and on the w. by Nebraska and South Dakota. The eastern boundary is formed by the Mississippi River, and the western, by the Big Sioux and the Missouri. The length of the state from north to south is 200 miles, its average length from east to west is about 300 miles and the area is 56,147 square miles. Population in 1910, 2,224,771.

**SURFACE AND DRAINAGE.** The surface of nearly the entire state is what is generally known as rolling prairie, consisting of long, low swells, separated by broad, shallow valleys. About three-fourths of the state slopes gently to the southeast. The average elevation is about 1100 feet, the highest point being in the northwest corner, with an altitude of 1700 feet, and the lowest point in the southwest corner, which has an altitude of about 500 feet. The rivers have broad valleys which are bordered by lines of bluffs. In the northern part of the state there are occasional hills which rise above the general surface.

The Des Moines is the largest river and flows across the central part of the state in a southeasterly direction. About two-thirds of the state is drained into the Mississippi, and aside from the Des Moines the streams of importance in this drainage area are the Turkey, the Wapsipinicon, the Cedar, the Iowa and the Skunk. The portion of the state drained into the Missouri is watered by the Big Sioux, the Little Sioux, the Nodaway and the Nishnabotna. The northwestern counties are a continuation of the lake region of Minnesota and contain a number of lakes noted for the beauty of their scenery and their clear water. The most important of these are Spirit Lake, East and West Okoboji, Clear Lake and Storm Lake. There are smaller lakes in Sac, Calhoun and other counties.

**CLIMATE.** Iowa has a cool temperate climate, with a wide range of temperature between the extremes of summer and winter. In July and August the temperature may reach 100°, while in midwinter it occasionally falls as low as 40° below zero. In the northern part of the state the snowfall is often heavy. The atmosphere is rather humid, and the climate is generally healthful. The average annual rainfall is 31.02 inches, and through the spring and summer months there is plenty of moisture for growing crops.

**MINERAL RESOURCES.** The middle and southern parts of the state are underlaid with coal, and the area extends northwesterly to near the central counties, though the mining area is confined to the valley of the Des Moines River. With the exception of Colorado, Iowa produces a larger quantity of bituminous coal than any other state west of the Mississippi River. There are valuable deposits of lead ore in the vicinity of Dubuque, these being extensions of the deposits found on the opposite side of the Mississippi, in Illinois and Wisconsin. Clay suitable for brick and tile is very generally distributed over the state and clay suitable for pottery is also abundant. In value the clay products rank next to coal. In Webster County, in the center of the state, there is a large deposit of gypsum, valuable for making stucco (See GYPSUM; PLASTER OF PARIS). Limestone and building stone are also distributed over the state. However, with the exception of the mining of coal and lead ore, the mining industries of the state are comparatively unimportant. There is also material for the manufacture of portland cement, and this will become an important industry.

**AGRICULTURE.** In 1910, 97.4 per cent of the surface of Iowa was included in farms, and of this area over 86 per cent was improved. Nearly the entire state is covered with a deep, rich soil, free from stones and easily tilled. There are practically no forest areas, the timber being confined to narrow belts along the streams. These conditions, combined with its thriving population, have made Iowa the leading agricultural state in the Union. Corn is the chief crop, and nearly one-fourth of the tillable area is planted to this cereal each year. The annual crop is about 300,000,000 bushels, placing Iowa one of the first among the corn-growing states. In the northern part of the state oats, rye and potatoes are more generally grown. Timothy, clover and alfalfa are raised, and large quantities of hay are obtained from native grass. Apples, grapes,

cherries and other fruits are produced in large quantities.

The state contains an abundance of grass land for pasturage and the growing of hay. This, with the large crops of corn and other cereals and an abundance of pure water, especially adapts Iowa to stockraising, and this branch of agricultural industry is very important, Iowa being exceeded in its number of cattle only by Texas. Large numbers of draft and driving horses are also raised, as are swine and sheep. Many farmers purchase animals from the grazing regions to the west and fatten them through the winter, so that the state exports a very large number of beef cattle. The dairy industry is also important and is of such magnitude as to place Iowa in the front rank as a dairy state. Creameries and cheese factories are numerous, and large quantities of butter and cheese are made in the homes. In 1910 Iowa was exceeded only by New York and Wisconsin in the number of milch cows.

**MANUFACTURES.** The manufacturing industries are limited, because of the great advantages in agriculture. The most important manufactures are those of lumber, flour and grist mill products, farm implements and machinery, pottery, glucose and food products, such as syrup and canned goods. The manufacture of pearl buttons, made from the shell of a fresh-water mussel which is found in abundance along the streams, is also an important industry.

**TRANSPORTATION AND COMMERCE.** The Mississippi affords transportation for the eastern part of the state, and the Missouri is also navigable, but the construction of numerous lines of railway and the obstructions to navigation, such as snags and shallow water, make these streams of less importance as means of transportation than they formerly were. Trunk lines of railway extend across the state from east to west in the northern, central and southern parts of the state, and these are connected by numerous cross lines. As most of these lines have constructed spurs wherever the traffic would warrant, every county in the state has one or more railway lines passing through it, and nearly every town is within a few miles of a railway station. Thus transportation facilities are adequate and convenient for all industries. The railway mileage exceeds 10,000 miles.

The commerce of the state is large; it consists in the export of grains, live stock, meat, butter, poultry products and some manufactures, and the import of manufactured goods

and foodstuffs that cannot be profitably produced within the state.

**GOVERNMENT.** The legislative department consists of a senate, restricted to 50 members elected for four years, and a house of representatives of 108 members, elected for two years. The senators are divided into two classes, so that the terms of one-half of their number expire every two years. The executive department consists of a governor, a lieutenant governor, a secretary of state, an auditor, a superintendent of public instruction, three railroad commissioners, a clerk of the supreme court, an attorney general and a treasurer, each elected for two years. The judicial department consists of a supreme court, composed of six judges, elected for six years; twenty district courts, each district having from two to four judges, elected for the term of four years; various superior courts; justice courts and police courts. There is also a board of control which has charge of the state reformatory and charitable institutions. Local government is administered by county officers.

**EDUCATION.** Iowa maintains an excellent system of public schools, and her percentage of illiteracy is very low, in 1910 being only 1.7. The public schools are supported almost wholly by local taxation (82.62%). The public lands given by Congress to the state for the support of the schools were sold in pioneer days at a very low figure, largely from \$1.25 to \$5.00 per acre, and consequently the state fund is exceedingly small. The highest officer is the superintendent of public instruction, and the schools of each county are under the supervision of a county superintendent. There is a state board of examiners which issues state licenses to teachers upon examination or upon graduation from accredited colleges and normal schools. Most of the towns and villages maintain high schools, which are accredited by higher educational institutions of the state and by the standard independent colleges of the state. The state institutions of higher learning include the state university at Iowa City, the state college of agriculture and mechanic arts at Ames and the state teachers' college at Cedar Falls. The three institutions are managed by a single state board of education, recently established by the legislature to displace the three separate boards. These institutions are among the best in the United States. The agricultural experiment station is located at the state college. There are a number of other colleges and secondary schools maintained by the various religious denomi-



## Iowa

nations. Important among these are the Upper Iowa University at Fayette, Iowa College at Grinnell, Cornell College at Mount Vernon, Iowa Wesleyan University at Mount Pleasant, the Central University of Iowa at Pella, Penn College at Oskaloosa, Norwegian Lutheran College at Decorah, Tabor College at Tabor, Des Moines College and Drake University, both at Des Moines, Simpson College at Indianola, Morningside College at Sioux City and Highland Park College at Des Moines.

**INSTITUTIONS.** There is a soldiers' orphans' home at Davenport and a soldiers' home at Marshalltown. The state maintains a college for the blind at Vinton and an inebriate hospital at Knoxville; also a school for the deaf at Council Bluffs and a home for feeble-minded children at Glenwood. The hospitals for insane are at Mount Pleasant, Independence, Cherokee and Clarinda. The state penitentiaries are at Fort Madison and Anamosa, and there is an industrial school for boys at Eldora and one for girls at Mitchellville.

**CITIES.** Considering the large population of the state, Iowa is unique in having no large cities. Those of importance are Des Moines, the capital; Dubuque, Davenport, Sioux City, Council Bluffs, Cedar Rapids, Burlington, Ottumwa, Iowa City, Cedar Falls, Waterloo, Fort Dodge, Clinton and Keokuk, each of which is described under its title.

**HISTORY.** The present territory of Iowa was originally inhabited by Indians of the Iowa, Illinois, Sac and Fox tribes. In 1673 Marquette and Joliet entered the territory, but no attempt at permanent settlement was made until 1788, when a French Indian, Julien Dubuque, built a fort on the site of the city now bearing his name. This was later abandoned. Meantime, in 1803, the United States gained possession of the territory by the Louisiana Purchase, and thereafter Iowa formed a part, in turn, of the territories of Louisiana, Missouri, Michigan and Wisconsin, until 1838, when it was organized as Iowa Territory. A few years before, settlements had been established at Fort Madison, Dubuque and Iowa City. After considerable agitation the state was admitted to the Union in 1846. Thereafter its growth was rapid until the outbreak of the Civil War. The constitution of the state prohibited slavery, and Iowa was active in the Union cause. Since the war advanced legislation has been passed concerning the problems of labor and railway control. From 1884 to

## Iowa State College of Agriculture

1894 Iowa was a prohibition state, and on Jan. 1, 1916, prohibition again became effective.

**Iowa, STATE UNIVERSITY OF,** a coeducational institution of higher learning, founded at Iowa City in 1855. An act of Congress provided an endowment of two townships of land. The university was reorganized in 1860 and now comprises the college of liberal arts, the graduate college, colleges of law, medicine, homeopathic medicine, dentistry, pharmacy, applied science (engineering) and the school of political and social science, the school of education, the school of music and the Lakeside Laboratory at Okoboji. The college of liberal arts maintains a summer session for teachers and a summer school for library training. It also maintains a lecture and university extension department. The university now has nearly 30 buildings, situated on a campus of about 50 acres on the banks of the Iowa River. The buildings are grouped artistically about the "Old Capitol," the corner stone of which was laid on July 4, 1840. The annual income is over \$400,000. Its enrollment is about 2000 and there are over 165 members in the faculty. The libraries contain about 130,000 volumes.

**Iowa,** a tribe of Indians, the remnants of which are now living in Kansas and Oklahoma on reservations, but which early in the eighteenth century inhabited Minnesota and that region to the south which is now the state of Iowa.

**Iowa City, Iowa,** the county-seat of Johnson co., 54 mi. w. of Davenport, on the Iowa River and on the Chicago, Rock Island & Pacific railroad. It was the capital of the state until 1854, and the original capitol building and grounds are now used by the state university. Here are also the Iowa City Academy, the state historical society's library, a Carnegie library and Mercy Hospital. Other important structures are the courthouse, the city hall and the opera house. The various manufactures include agricultural implements, flour, meats, woolen goods and jewelry. The place was founded in 1839 and became a city in 1853. Population in 1910, 10,091.

**Iowa River,** a river in Iowa, rising in Hancock County. It flows in a southeasterly direction into the Mississippi. It is 300 miles long and is navigable for a distance of 80 miles from its mouth.

**Iowa State College of Agriculture and Mechanic Arts,** a coeducational institution, established by an act of legislature in 1858 and located at Ames, Iowa. In 1862, together with

## Ipecacuanha

other agricultural colleges, it came into the possession of a tract of land granted by Congress (See AGRICULTURAL COLLEGE). The institution was not formally opened until 1869. It contains departments in agriculture, engineering, veterinary medicine, science and domestic economy. The instruction is of the highest grade, and the state agricultural experiment station is connected with the college. The institution has a farm of nearly 800 acres, upon which the theories are applied in practical agriculture and portions of which are used by the experiment station in working out results. Some of these results have been highly beneficial, not only to the farmers of Iowa but to those of a number of other states bordering on the Mississippi. The number of students is about 2500, and the number on the faculty is over 160. The library contains 35,000 volumes.

**Ipecacuanha**, *ip'e kak'u an'a*, a medicinal substance of a nauseous odor and a repulsive, bitterish taste. It is the dried root of several kinds of plants growing in South America. The best is the annulated ipecacuanha, which comes from a small, shrubby plant, a native of Brazil, Colombia and other parts of South America. The name of *American Ipecacuanha* is given to euphorbia, which grows in sandy places in North America.



IPECACUANHA

**Iphigenia**, *if'y je ni'ah*, in Greek legend, the daughter of Agamemnon and Clytemnestra. Agamemnon, by killing a hind sacred to Diana, had so enraged that goddess that she detained at Aulis the fleet which was prepared to sail against Troy, and when the oracles were consulted as to means of gaining favor with the goddess, they replied that Agamemnon must sacrifice his daughter. Iphigenia was accordingly sent for on the pretext that she was to be

## Iranians

married to Achilles, but when she arrived at Aulis she was delivered to the priests to be sacrificed. As she was about to be killed, she was caught up by Diana in a cloud and carried to Tauris, while a hart was left in her place. At Tauris she became priestess of Diana, and it was here that her brother Orestes afterward found her.

**Ipsambul**, *cep sahm'bool*. See ABU-SIMBEL.

**Ipswich**, *ips'wich* or *ips'ich*, MASS., a town of Essex co., on the Ipswich River and on the Boston & Maine railroad, 27 mi. n. e. of Boston. Hosiery, isinglass, heels, underwear and soap are manufactured here. The town was settled in 1633 by John Winthrop and was given the name of Agawam, but the name was changed in the following year to Ipswich. It was one of the earliest of the American towns to resist taxation by the British Parliament. Population in 1910, 5777.

**Iquique**, *e ke'kay*, a city of northern Chile, South America, capital of the Department of Tarapaca, is situated on the Pacific coast, in the vicinity of valuable saltpeter and silver mines. Iquique formerly belonged to Peru, but in 1891 the Chileans stormed and captured it. Population in 1907, 40,171.

**Iran**, *e rahn'*, the name given by the ancient Persians to their native land. It is still used by the modern Persians, though it is also employed in a wider sense to designate the whole of the country from the Indus to the Tigris.

**Ira'nian Lan'guages**, a family of languages belonging to the Indo-European stock, closely allied to the Indian group and called by some philologists Persian, from the best-known member of the family. The two oldest known Iranian languages are the Old Persian of the cuneiform inscriptions and the Old Bactrian, or Zend, the latter the language in which the Zend-avesta, or sacred writings of the Parsees, is composed. The Middle Iranian languages are the Pehlevi, and still later the Parsee, which are preserved in the commentaries to the Zend-avesta. The latter approaches closely the modern Persian. The most important of the New Iranian languages is the modern Persian, in which has been produced a rich and celebrated literature.

**Iranians**, a name derived from Iran, the ancient name of Persia, and applied to Persians, ancient and modern, Bactrians and Kurds. Conquest and the natural intermingling of tribes has made it impossible to define closely the limits of the Iranian stock as it exists to-day.



## Irawadi

The ancient Medes and Persians were a highly civilized people, but some of the Iranian hill tribes were never far from savagery. The ancient religion of the Iranians was that of Zoroaster, but in modern times most of them profess Mohammedanism.

**Irawadi**, *ir a wah'dy*, or **Irrawaddy**, a large river of southeastern Asia, traversing Lower and Upper Burma from north to south, falling into the Indian Ocean (Bay of Bengal) by various mouths, forming a great delta. The chief tributaries are the Khyendwin and the Bhaino, and the Rangoon and the Bassein branch form the east and west boundaries of the delta, a region covered with forests of teak. The river is navigable for 800 miles, though there are some rapids which offer obstruction. Mandalay is situated on the banks of the Irawadi.

**Ire'land** (in Irish, *Erin*; in Latin, *Hibernia*), popular name, the EMERALD ISLE, the more western and the smaller of the two principal islands of which the United Kingdom is composed. It is separated from Great Britain on the east by the Irish Sea and is surrounded on all other sides by the Atlantic Ocean. Measured diagonally, the greatest length, from Mizen Head in the southwest to Fair Head in the northeast, is 300 miles; and the greatest breadth, from Carnsore Point in the southeast to Benwee Head in the northwest, is 212 miles; the central breadth, between the bays of Dublin and Galway, is 110 miles. The area is 32,531 square miles, a little less than that of Maine. Population 4,390,219.

**SURFACE AND DRAINAGE.** The coast, forming a line of nearly 3000 miles, is, in general, bold and rugged and has numerous indentations, some of which run far into the land and form excellent natural harbors. There are a number of islands, chiefly on the west coast, the largest being Achill. The mountains, generally speaking, rise in isolated masses at a short distance from the coast, the interior having the form of a vast plain, in which are extensive tracts of bog. The Macgillicuddy's Reeks, in the southwest, are the highest land, the culminating summit being Carrantual, 3414 feet. The mountains of Wicklow, in the southeast, reach a height of over 3000 feet.

Rivers are not only numerous, but are very equally distributed over the surface. The Shannon, in the west, the largest river of Ireland, if not of the United Kingdom, is navigable to its source in Lough Allen, forming a waterway of 240 miles. The other rivers of most importance are the Bandon, the Lee, the Blackwater, the Suir

## Ireland

and the Barrow, which enter the sea on the south, the last two by the union of their streams forming the broad estuary of Waterford harbor.

**CLIMATE.** The climate is on the whole more moist, milder and more equable than that of the greater part of Britain. It is highly favorable to vegetation and allows many delicate plants to winter in the open air; some species of plants grow in Ireland but nowhere else in the British isles, as, for instance, the strawberry tree or arbutus, found in the southwest. See GREAT BRITAIN, subhead *Climate*.

**MINERAL RESOURCES.** In some cases, particularly in the southwest, the coal measures occupy considerable areas, but the quality of the coal is generally very inferior, and it is worked only to a very small extent, the yearly output being only about 100,000 tons. Of other minerals than coal, Ireland yields small quantities of iron ore, lead ore, slate, alun and salt.

**FISHERIES.** Though not so large as those of Scotland and England, the fisheries of Ireland constitute an industry of considerable importance and give employment to about 28,500 people. The value of the yearly catch is about \$1,000,000. Salmon abound in the streams and coast waters, and herring, cod and pilchard are also taken in large quantities.

**AGRICULTURE.** As regards agriculture, Ireland has great advantages; for though there is a great extent of moorland, there is also a vast area of arable surface, covered with a deep, rich soil. Notwithstanding, agriculture on the whole is in a backward state, a result largely due to the small farms and to the evils of overcropping. Most of the land is held in large estates and rented on oppressive terms to permanent tenants. However, within the last few years there has been a marked improvement in agricultural conditions. The rearing of live stock and dairy farming are largely carried on. By far the largest grain crop is oats; the chief food crop is potatoes, which are cultivated over an area about one and a half times as large as in Great Britain. Another staple crop, especially in the north, is flax.

**MANUFACTURES.** The leading manufacture consists in the making of linen goods. This industry has its center in Belfast, which has become famous for its excellent linens. Considerable attention is also given to the manufacture of woollen textiles. Brewing and distilling are also important, as is the embroidering of muslin, which in and about Belfast gives employment to a large number of people.

## Ireland

**TRANSPORTATION.** Railways connect all of the leading towns. The Shannon is navigable for ocean steamers as far as Limerick, and nearly all streams are navigable in their lower courses for smaller boats. Many of the rivers have been canalized, and all of the principal streams are connected by canals, so that Ireland has an excellent system of inland waterways, which, combined with the railways and good roads, afford ample transportation facilities.

The principal articles of export are grain, live stock, dairy products, fish and manufactured articles, particularly linen, whisky and porter. Most of the trade is with England.

**INHABITANTS AND LANGUAGE.** The larger part of the inhabitants are descendants of the ancient Celts, who occupied the island at the time of the Roman conquest of Great Britain. The people are known as Irish, and their language is a branch of the Celtic tongue and is used quite generally by the country people; English, however, is the prevailing language in towns, is the official language and is spoken to some extent and quite generally understood by all. The Irish people are noted for their kindness, industry and wit. Thousands of them have emigrated to other countries, particularly to the United States, where they have become naturalized and make good citizens.

**GOVERNMENT AND RELIGION.** Ireland, by the act of union, became in 1801 an integral part of the United Kingdom. As in England, the chief legal functionaries are a lord chancellor, a lord chief justice and a master of the rolls. For local government the island is divided into four provinces and thirty-two counties. See *GREAT BRITAIN*, subhead *Government Administration in Scotland, Wales and Ireland*.

The Roman Catholic faith is embraced by the larger part of the inhabitants. The Anglican Church and the Presbyterian Church have the next largest followings, while other Protestant denominations are found in the larger cities, though their following is small. All churches are supported by voluntary offerings.

**EDUCATION.** The principal educational institutions are Dublin University and the three Queen's Colleges of Belfast, Cork and Galway. The Queen's Colleges were formerly connected with an examining and degree-conferring body (Queen's University); but for this a similar body, the Royal University of Ireland, was substituted in 1882, \$100,000 being yearly granted from the surplus funds of the Irish church. The Royal College of Science, established in 1867, supplies

## Ireland

a complete course of instruction in science applicable to the industrial arts. The Catholic University of Ireland, established in 1854, consists of University College, Dublin; Saint Patrick's College, Maynooth, and several other colleges. See *EDUCATION, NATIONAL SYSTEMS OF*, subhead *Great Britain*.

**CITIES.** The chief cities are Dublin, the capital; Belfast, Cork, Limerick and Queenstown, which is an important seaport. Each of these is described under its title.

**HISTORY.** Little is known with certainty concerning the earliest history of Ireland. From the native legends we know that the island was for many centuries inhabited by various Celtic tribes; but the authentic record begins with the fourth century A. D., when the Scoti, the strongest tribe, subdued the other tribes inhabiting the island and descended upon Britain, then a Roman province. From Britain they extended their expeditions into Gaul. In these early centuries, Ireland seems to have been divided into numerous provinces, each of which, although it had its own king, was dependent on one monarch, to whom the central province was given. Each clan also had a chief, who was chosen from its most important family. The religion of Ireland in the early centuries of the Christian era was a nature worship, and the priests, or Druids, and poets, or bards, occupied a position almost equaling that of the king in honor. Christianity found its way into Ireland at an early date, and by the middle of the fourth century it had made considerable progress. It is said that more than in any other heathen country, conversion to Christianity in Ireland was bloodlessly effected. By 432 the young British priest, afterward known as Saint Patrick, began his great mission in Ireland. Other missionaries continued the work in the sixth century, and many churches and monasteries were founded. Religion and learning flourished in the monasteries, which soon began to send out zealous missionaries to establish churches in Britain and on the continent.

In the eighth century the Norsemen began to make incursions upon the Irish coast, and by the ninth century they had pushed far into the interior and founded a kingdom. Brian Boromhe defeated them in 1014 and united the greater part of the island under his rule. After the death of Brian, the island relapsed into its former state of division and anarchy. Henry II of England was authorized by the pope in 1155 to take possession of Ireland on condition of paying an annual tribute, but not until twelve



years later was he able to turn his attention to the island. Dermot MacMurragh, king of Leinster, who had been driven from his kingdom, fled to England and, seeking refuge at the court of Henry II, obtained permission to enlist the services of English subjects for the recovery of his realm. Returning with a force of English, led by Richard Clare, called "Strongbow," Dermot was for a time successful, and regained his seat on the throne. Upon his death Strongbow, who had married Dermot's daughter, came to the throne, and his English subjects were permitted to establish themselves on lands in the eastern part of the island. When Henry II visited Ireland in 1172 he received the homage of the great princes and was recognized as lord of Ireland.

Many Norman barons and their followers now settled in the country, but the English power was far from being established over the whole of it, and the gradual adoption by these new settlers of the customs and languages of the natives decreased British power. By the time of the Wars of the Roses the only part over which England had real authority was a few towns on the coast and a small district about Dublin and Drogheda, known as the Pale. The Irish lived according to their old customs, under their own chiefs, and in manners and mode of life were still totally uncivilized. Under Henry VII a law was enacted making the Irish parliament dependent upon the English king, and the power of the English thus became somewhat stronger.

Soon after Henry VIII had declared himself the head of the Anglican Church, he began his crusade against the Catholics in Ireland. He caused the monasteries to be destroyed and their wealth to be confiscated, and ordered the prosecution of all persons who refused to recognize him as the head of the Church. To offset these attacks on the religion of the Irish, Henry allowed the Irish chiefs a share in the confiscated property of the monasteries and left them under their own laws. In 1541, by an act of the Irish Parliament, Henry was given the title of *King of Ireland*, instead of *Lord*. Edward VI continued the policy of his father of combating the Catholic religion in Ireland, but this change was bitterly opposed, and Mary was able to undo all that had been done by her two predecessors in establishing the Protestant religion.

Elizabeth in her turn imposed Protestant clergy upon the people, and her reign was marked by a series of risings which terminated in the reduction of the whole island. Great stretches

were taken from the Irish chiefs and distributed among English noblemen, who were to settle their new estates with English farmers. The injustice of this system and the fact that Catholics were excluded from all public appointments led in 1641 to another attempt to shake off the English yoke. Great atrocities were committed on both sides. In 1641 Cromwell was appointed lieutenant of the island and energetically but cruelly reduced the country in nine months. James II, himself a Catholic, advanced Catholics in Ireland to important positions, and when, after the revolution which placed William and Mary on the throne, James landed in Ireland and sought Irish aid for his restoration, he was enthusiastically received. In 1690, however, William III landed in the island and in the Battle of the Boyne completely defeated the forces of James. Limerick, the last place which held out for James, capitulated in 1691, and a treaty was concluded by which the Catholics in Ireland were to be allowed the exercise of their religion. This treaty was not well kept by the English. By a decree of Parliament passed a short time later, hundreds of thousands of acres of Irish land were confiscated and divided among Protestants. Cruel penal laws were passed against those who adhered to the Catholic religion; Catholic ecclesiastical dignitaries were banished, and all Catholics were declared incapable of holding public office, acquiring landed property or marrying a Protestant.

All of these laws were not always rigorously carried out, yet they excited great bitterness of feeling and led to frequent risings. In 1778 the laws were made much more lenient, the Catholics were given a right to acquire landed property, erect schools and exercise their religion under fewer restrictions. In 1798, while England was engaged in the war with the revolutionists in France, the Irish again revolted, but the rebellion was speedily crushed. The British government now resolved to unite the English and Irish parliaments, and an act providing for the legislative union of the two countries passed the Irish and the British parliaments in 1800. This act went into effect on January 1, 1801.

The Irish patriots bitterly opposed this extinction of the legislative independence of Ireland, and from that day until the present there has been more or less agitation for its repeal and the establishment of the old Irish parliament. In 1841, under Daniel O'Connell, Ireland was brought to the verge of insurrection, but the movement was suppressed (See O'CONNELL,

DANIEL). For many years other troubles had racked Ireland, occasioned by the oppressive land laws which had been enacted from time to time. The suffering caused by these laws came to a climax in 1845 and 1846, when a great potato famine occurred. Thousands died of starvation and hundreds of thousands emigrated to America. Subsequently certain reforms in the land laws were carried out, and agricultural and manufacturing interests revived, but the struggle for liberty continued and took form in an agitation for so-called home rule (See HOME RULE). A permanent act for the repression of crime in Ireland was passed in 1887. In 1898 an important act was passed, establishing Irish county councils, rural district schools and boards of guardians, and encouraged by this the people began to proclaim more boldly their discontent with the existing land laws and their desire for home rule. In 1903 the Land Purchase Bill was passed, providing that tenants or sub-tenants may purchase the land from great landlords and hold it as their own. The disposal of the land question removed one of the vexing preliminaries to Home Rule. In 1914 the Government of Ireland Bill, as the Home Rule measure was officially called, became a law. The steps leading to this great event are presented in the article HOME RULE.

The principal feature of the law is the provision for an Irish parliament, which shall have power to make laws for the "peace, order and good government of Ireland," but only in respect to matters relating exclusively to Ireland. The law expressly states, however, that the supreme power of the British parliament remains undiminished. The army and navy, foreign relations, naturalization, coinage and a number of other subjects are not open to legislation by the Irish parliament. The parliament must meet at least once a year. It is composed of a Senate of 40 members and a House of Commons of 164 members. The first 40 senators will be named by the imperial government for five-year terms; thereafter they will be elected by a system of proportional representation. Members of the house of commons will be elected by Irish constituencies. There will also be 42 Irish members in the British Parliament.

The executive power vests in the king, represented by the lord-lieutenant, who may give or withhold his assent, as the king's representative, to bills passed by the Irish parliament. A ministry responsible to parliament, like the British ministry, is the active executive.

The financial arrangements are too detailed for extended explanations. Briefly, there is an Irish exchequer, which pays the expenses of the government, but all duties and taxes are paid to the imperial exchequer, which "transfers" the total amount to the Irish exchequer. Besides the "transferred" funds the Irish exchequer will receive an annual subsidy of £500,000 for three years after the law goes into effect; thereafter the subsidy is to be reduced by £50,000 each year until a minimum of £200,000 is reached.

LANGUAGE AND LITERATURE. The Irish language belongs to the Gaelic branch of the Celtic group of languages, and it is closely akin to the Gaelic of Scotland and the Manx, and more remotely allied to the British dialects—Welsh, Cornish and Breton. While there are in Ireland many people who speak the Irish language only, by far the larger part of the inhabitants speak English, also.

Irish literature is rather varied and extensive, including history, legendary and actual, in prose and verse; annals, genealogies and pedigrees, mythological and imaginative tales, lyric poetry, satire, lives of saints and treatises on law, science and grammar. Some of these may be as old as the fifth century of our era. One of the earliest historic pieces is a metrical life of Saint Patrick. The glosses written to Latin works by Irish ecclesiastics, in the monasteries on the Continent, founded during the seventh and eighth centuries, are among the oldest specimens of the language. Many bardic remains belong to the period of the English conquest, but after that date Irish poetry appears to have sunk. Many bards, however, who were still maintained by the native chiefs, helped by their songs to keep up a national feeling hostile to the English domination. The chief interest, in fact, in medieval Irish literature attaches to the ballad cycles.

Although Irish prose almost ceased to be produced after the seventeenth century, the Irish language has been used in poetry up to the present time. The last years of the nineteenth century saw the beginnings of a movement in literature which corresponds roughly to the Home Rule or nationalist idea in government. A drama and poetry in which the Irish nation may express itself, are the aim of this new school, led by William Butler Yeats, Lady Gregory and John M. Synge. Most of the works of this newer generation of writers are in English, but a few are in Gaelic.



## Ireland

**Ireland**, JOHN (1838- ), an American Catholic prelate, born in County Kilkenny, Ireland. His parents settled in Saint Paul, Minn., and he was educated in France for the priesthood and was ordained in 1861. After his ordination he became prominent as a temperance advocate. He was made coadjutor bishop of Saint Paul in 1875, and on the resignation of Bishop Grace, in 1888, he was made archbishop of Saint Paul. He was also active in establishing the Catholic University in Washington, in colonizing the Northwest and in many other movements, in all of which his personality has won for him great influence.

**Ire'ton**, HENRY (1611-1651), an English general, son-in-law of Cromwell. He joined the Parliamentary army at the outbreak of the war against Charles I, was taken prisoner at the Battle of Naseby but regained his liberty at the close of the engagement. As a member of the court which tried Charles I, he was an advocate of the death sentence and was one of the signers of the death warrant. Cromwell, when he was recalled from Ireland on the outbreak of insurrection in Scotland, left Ireton to complete the subjugation of Ireland, and this he did with much severity. He died at Limerick and was buried in Westminster Abbey. His body was taken up at the Restoration and burned.

**Irid'ium**, a metal of a whitish color, discovered in the black scales which remained when native platinum was dissolved in *aqua regia*. Iridium takes its name from the variety of colors it exhibits while dissolving in hydrochloric acid. It is not malleable and is the most infusible of metals. It forms a number of alloys, one of which, *iridosmine*, occurs native. The alloy with gold is malleable and much resembles gold in appearance; that with copper is very hard, pale red in color and ductile. The iridium ores are found on the Pacific coast of the United States, in various districts of the Ural Mountains and in smaller quantities in other parts of the world.

**Iris**, in Greek mythology, the fleet, golden-winged messenger of the Olympian gods, represented with wings and with a herald's staff in her hand. The rainbow was originally regarded as the path over which she passed to earth, and thus Iris herself came in time to be regarded as the personification of the rainbow.

**Iris**. See EYE.

**Iris**, a genus of plants belonging to a family which is related to the lilies. One species,

## Irish Moss

known as the *flower-de-luce*, or *fleur-de-lis*, became the national flower of France in the thirteenth

century and later was used as the national emblem. It is also the emblem of the city of Florence. The common blue flag, which grows wild in the United States in swamps and other moist places, is another species of the iris. Orris root comes from a European species.

Many beautiful species are grown in gardens, and many varieties are produced by cultivation.

**Irish Moss**, a seaweed very common on rocks and stones on the coast of England and



BLUE FLAG



IRISH MOSS

Three different forms of growth.

Ireland. It is a variable weed with a flat, branching frond, usually of a deep purple-brown color. When dried it becomes whitish, and in this condition it is known as Irish moss.

## Irish Sea

Nutritious soups and jellies are made from it. Carrageen is one of its local names.

**Irish Sea**, the part of the Atlantic Ocean between Great Britain and Ireland, n. of Saint George's Channel and s. of the North Channel. It is 130 miles long and about 60 miles wide. It contains the islands of Anglesey and Man.

**Iritis**, an inflammation of the iris of the eye. It is accompanied by a remarkable change in the color of the iris and causes great pain in the eye, forehead and side of the head, a pain which frequently grows more severe at night. Iritis may be caused by wounds in the iris, from too prolonged use of the eye or from constitutional diseases, such as rheumatism or tuberculosis.

**Irkutsk**, *eer kootsk'*, a city in southern Siberia, capital of a government of same name, situated on the Angara, 30 mi. from the northwest shore of Lake Baikal. It manufactures woollens, linens and leather and carries on a good trade in tea and other articles imported from China. Population in 1910, 108,060.

**Iron**, *i'urn*, a hard, silver-gray metal, with a soft but brilliant luster. It is about seven and three-fourths times as heavy as water; has a fibrous or crystalline structure, according to the process of manufacture; softens before fusing; is highly ductile and malleable (See DUCTILITY; MALLEABILITY), and can be tempered to various degrees of hardness (See TEMPERING). Iron has a strong tendency to unite with oxygen, forming a number of oxides, some of which constitute its most valuable ores. It also unites with sulphur, chlorine and carbon dioxide. The compounds with chlorine are useful in medicine, and one of the compounds of sulphur, commonly known as pyrite, is of value in the manufacture of iron sulphate, or copperas.

Pure iron is seldom seen and is useful only in laboratories for experimental purposes. The iron of commerce contains varying proportions of carbon, silicon, sulphur, phosphorus and other impurities. Of these carbon exists in the most varying proportions and produces the greatest effect upon the quality of the metal. Sulphur and phosphorus are highly injurious. Sulphur, even in very small quantities, makes steel brittle when heated, or *red short*, and phosphorus makes it brittle when cold, or *cold short*. Iron unites with nickel, aluminum, manganese and one or two other metals to form valuable ores.

**ORES.** *Kinds.* The most common ores of iron are red hematite, or specular iron, brown

## Iron

hematite, or limonite, magnetic iron, or magnetite, and carbonate of iron, or spathic iron. Each of these is described under its proper title. The red hematite is found in by far the largest quantities, and it is from this ore that most of the iron of commerce is obtained.

*Distribution.* Iron ore is very liberally distributed over the earth, and with the exception of Australia every continent has a good supply. In Europe the most valuable deposits are found in the Ural and Caucasus Mountains in Russia; in the Scandinavian peninsula; in Lorraine and Luxemburg, Germany; in Spain and the island of Elba; in Styria, Austria, and in England in North Yorkshire, Cumberland, Lancashire, Leicestershire and Northampton. The ore obtained from the Russian and Scandinavian mines is magnetite and hematite of a high grade, while that obtained from the other mines is low grade hematite or limonite. Extensive deposits of ore are also found in China and India and smaller quantities in Japan, while Africa contains very large deposits, though none of them have been worked except as a few of the native tribes in the equatorial regions by rude methods fashion the metal into weapons and edged tools. Canada has extensive mines in Newfoundland, Quebec, Ontario and British Columbia. There are also large deposits of iron in the various mountainous countries of South America.

The United States is the largest producer of iron ore. The districts from which this is obtained are around Lake Superior, in the Adirondaek Mountains, in Western Pennsylvania and Virginia and in Alabama and Georgia. By far the largest quantity of iron comes from the red hematite, as shown from the following table:

Red hematite.....	78.58 per cent.
Brown hematite .....	13.28 per cent.
Magnetite .....	7.57 per cent.
Carbonate .....	.57 per cent.

The different areas from which iron ore are obtained are comparatively small. The Lake Superior region lies within half of a circle having a radius of 135 miles, and most of the mines are near the circumference of this circle. A circle 100 miles in diameter would include the ore regions of Alabama and Georgia. A parallelogram 60 miles long and 20 miles wide would embrace all the valuable mines of the Lake Champlain district in northern New York, and Lebanon County would include the valuable mines of Pennsylvania. The Lake Superior



region is by far the most productive and yields nearly three-quarters of the ore produced in the country. The principal states, in the order of their production, are Minnesota, Michigan, Alabama, Pennsylvania and New York. The following states produce considerable ore: Virginia, Wisconsin, Tennessee, New Jersey, Georgia, Colorado, Missouri and Ohio.

*Mining and Shipping Ore.* The methods of mining depend upon the character of the ore. If it is in the form of a ledge, the rock must be blasted; but if the rock is disintegrated, this process is not necessary. The most interesting method is that employed in the Lake Superior region. Here the ore is in the form of rotten stone, which is so soft that it can be scooped up with steam shovels and loaded directly upon the cars. The only preparation necessary to obtaining the ore is the removal of the surface soil, or *stripping*. The shovels are of large size, and under favorable conditions a single shovel will handle 6500 tons of ore in a day, at an average cost of sixteen cents a ton (See STEAM SHOVEL). The ore cars are so constructed that they can be emptied by dumping or by opening slides in the bottom. When they reach the ore docks, the cars are run on to an elevated platform, beneath which are numerous bins or pockets, each having a slanting floor leading to a chute. The ore is dumped from the cars into these pockets, and the chutes are connected with the hold of a vessel; and when the valve is opened at the entrance of the chute the ore runs into the hold. A large vessel connects with several chutes and requires but a few hours for loading. Ore vessels are constructed especially for this sort of traffic and transport ore from Duluth or adjoining ports to Cleveland and Erie at an expense of less than two dollars per ton.

Devices for unloading the vessels are even more ingenious than those for loading. Steel bridges mounted upon elevated tracks and operated by electric motors are so arranged that they can be brought opposite an opening in the ship's hold. At the end of the bridge next to the vessel is a hinged arm that lowers into the hold. This arm and the bridge carry a trolley containing *grabs*, which resemble in shape and construction a double scoop. When the grabs descend to the ore, they fill and close automatically. Each holds about five tons, and they move over the arm at the rate of 100 feet per minute and over the bridge at the rate of 1000 feet per minute, unloading the ore directly on to

cars or the dock, as desired. By these devices a large vessel can be unloaded in from six to eight hours.

*Smelting.* The ore contains numerous impurities, and in the process of extracting the iron these must be removed. Most of this work is done in the process of smelting. The ore is crushed so that it is as fine as fine gravel. It is then mixed with the necessary proportions of limestone (See FLUX) and coke, and is next taken to the furnace (See BLAST FURNACE). As the iron melts, it runs down to the hearth of the furnace and is drawn off, being cast into rough bars known as *pig iron*. In small furnaces two casts are made every twenty-four hours, but with large furnaces the iron is drawn more frequently.

The former method of making pig iron, and one still used in some furnaces, was to have the floor of the foundry covered with molders' sand to a depth of six or eight inches. In this sand long square channels are made leading from the furnace to various parts of the room, and from each of these, short channels are excavated at right angles. The iron is tapped from the furnace into the long channels, which conduct it to the short ones, and in this manner the entire floor of the foundry becomes covered with molten iron, which, when cool, forms bars. The long channels are called *sows*, and the short ones, *pigs*; hence the name *pig iron*. The method now more generally used in connection with large furnaces employs casting machines, instead of the sand floor. The casting machine consists of two endless chains carrying steel molds of the size and shape of a bar of pig iron. The molten iron is drawn from the furnace into a ladle, and from this it is poured into the molds as they pass along. When filled, the molds pass through a tank of water, to be cooled, and then they move on to the tail sheaves, where the pigs are unloaded on the cars. One of these machines can cast twenty pigs of 120 pounds in a minute.

VARIETIES OF IRON. The varieties of iron in general use are pig iron, wrought iron and steel.

*Pig Iron.* The process of manufacturing pig iron is described above. Pig iron has a crystalline structure, contains more or less impurities and is usually coarse and brittle. Before it can be used for purposes where great strength is required, it needs to be remelted and refined. It is, however, usable for making ordinary iron castings, such as the parts of stoves and brackets for holding shafting, but



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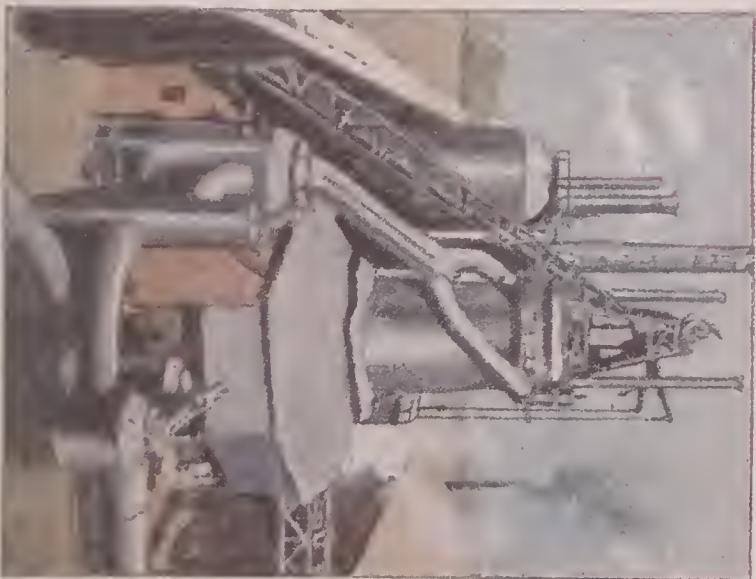
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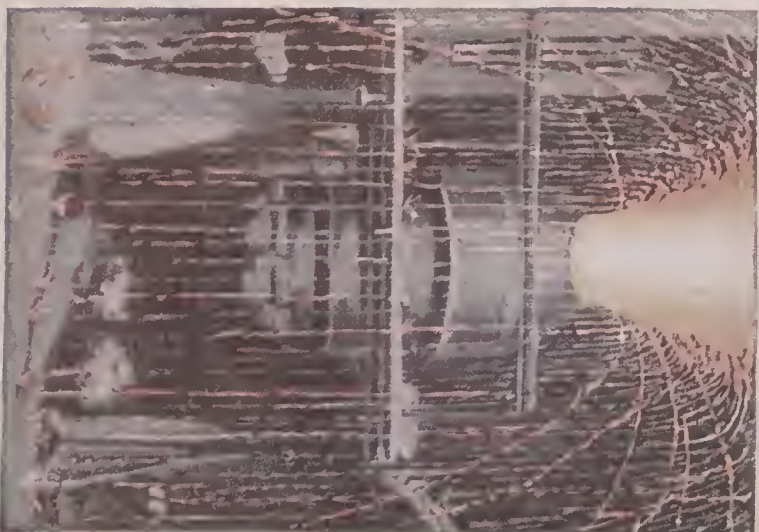
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## IRON AND STEEL

1, Iron Mine.

2, Steam Shovel.

3, Ore Train.

4, Steamer loading with ore.

5, Furnace.

6, Bessemer Converter.

7, Ingots.





most of it is manufactured into steel or wrought iron.

*Wrought Iron.* This is the oldest form of iron known and was manufactured directly from the ore by primitive methods long before the process of casting iron had been discovered. It is now usually made by remelting and purifying cast iron. The operation is carried on in a reverberatory furnace and is known as *puddling*. The furnace has an arched top and flat floor, or hearth, which is so placed in relation to the roof that the flame is bent down upon the hearth and softens the iron. In preparing the furnace for charging, the bottom and sides are covered with several inches of some oxidizing material, which is heated until it fuses. Slag is then spread over the bottom of the furnace, and the pig iron is broken into small pieces and laid upon it. Coal, coke or gas can be used for fuel, but gas is preferred. As the iron melts, workmen begin to stir it with a tool called the *rabble*, which is inserted through a small door. The stirring is continued until the color of the molten iron shows the workmen that the impurities have been expelled. The temperature is then gradually lowered, and the iron is gathered into balls. These are taken from the furnace and pressed between rollers to expel the slag. This leaves an irregular rough bar of iron, known as the *muck bar*. Several muck bars are then bundled together and heated to a welding temperature and rolled into blooms, which have the general form of wrought iron as it is placed upon the market (See ROLLING MILL).

Wrought iron is soft, flexible, ductile and malleable. It can be welded and also worked into any desired form. It has a fibrous texture, possesses great tensile strength and can be annealed to various degrees of hardness. These properties adapt it to a much wider range of uses than cast iron, but it has now been almost wholly displaced by steel (See STEEL).

**HISTORY.** Iron is the most useful of all metals and has been known from the remotest time, though it did not come into general use until much later than gold, silver and copper, probably because of the difficulty in obtaining it from its ores. The first reference to iron in the Bible is found in *Genesis* IV, 22, which refers to Tubal Cain as a worker or artificer in brass and iron. Iron is also referred to in the book of *Job*, which by some writers is considered to have been written before *Genesis*. The ancient Egyptians were familiar with the process of

working iron and undoubtedly knew how to make steel, since some of the tools used by them in building the pyramids and their great temples at Thebes and Memphis were of this metal. The Assyrians and Babylonians were also skilful workers in iron, and it is probable that the Greeks obtained their knowledge of iron-working from these older nations. The Romans obtained their knowledge from the Greeks and made considerable progress in improving the processes of manufacture. When these people invaded Britain they found the natives working iron in rude forges. Other nations of northern and central Europe were also workers of iron at an early date. But it was several centuries before the manufacture in England assumed sufficient importance to warrant its being considered as an industry.

Iron was discovered in the United States in 1585 by the expedition sent out by Sir Walter Raleigh. In 1608 a cargo of ore was shipped from Virginia to England and successfully smelted. The first ironworks in the United States were built in the Province of Massachusetts Bay not far from the present city of Lynn, between 1643 and 1645. The ore used was bog ore, which is still found in the vicinity. Other furnaces were erected, but previous to the Revolutionary War little was done in the smelting of iron in the colonies, chiefly because the industry was opposed by the home government. When the war broke out, the Americans, being deprived of opportunity for importing iron from Europe, were obliged to manufacture many articles for themselves, and this gave some impetus to the industry. Still, after the war it was several years before the manufacture of iron and steel assumed any considerable proportions. One of the most important steps leading to the present magnitude of the iron industry in the country was the use of anthracite coal for smelting. This practice was introduced by David Thomas, at Catasauqua, Pa., in 1840, and his furnace continued in use for twenty-eight years. The construction of railroads led to the use of coke as a fuel, and this still further extended the industry.

The invention of the Bessemer process for making steel greatly increased the demands for iron, and the progress of the industry in the United States has kept pace with these demands. This country now is the largest producer of iron and steel in the world, being followed in order by Great Britain and Germany, but the annual output of the United States now exceeds that of



both these countries. The leading manufacturing cities are not necessarily in the leading centers for the production of iron ore. It requires two tons of fuel to smelt a ton of iron, and it is cheaper to transport the ore than the fuel; consequently the great iron works of the country are in or near the coal regions. The leading states in the manufacture of iron in the order of their importance are Pennsylvania, Ohio, Illinois, Indiana, and Alabama. See INDUSTRIES, Volume V.

**IRON IN MEDICINE.** Iron is an important ingredient of the blood and some of the tissues, and when the system is deficient in iron, weakness and general debility follow. Usually, a preparation of iron will restore one in this condition to his normal health. Iron is also used as an astringent, and in some cases to stimulate digestion. The oxides and several salts are used in medical preparations, the most common being a tincture of the chlorate of iron.

For the manufacture of steel, see STEEL.

**Iron Age**, a term indicating the period or stage in civilization and culture when people used iron as the material for their tools and weapons. It is the last of the three prehistoric ages of progress. In Europe the knowledge of iron began at the south and extended northward. Greece, as represented in the poems of Homer, was then changing from the use of bronze to that of iron, while Scandinavia did not enter her Iron Age until about the beginning of the Christian era. The implements and weapons of the Iron Age are not cast, but are hammered into shape, and accordingly they take a greater variety of forms and are much more beautiful than those of the earlier ages. During the age of iron, written characters were introduced and the foundation of historic records was laid. See STONE AGE; BRONZE AGE.

**Iron Cross**, a Prussian military decoration, instituted by Frederick William III in 1813 and revived by Emperor William I in 1871. It is awarded to soldiers who have distinguished themselves in war. The cross is Maltese in form, is made of iron, edged with silver, and is worn suspended from the neck or pinned to the coat. Officers of high rank may receive a cross double the ordinary size.

**Iron Crown**, a golden crown set with precious stones, used at the coronation of the Lombard kings and afterward at the coronation of the German emperors, when the latter assumed the character of kings of Lombardy. It received the above name from an iron circle in it, forged according to tradition, from a nail of the cross

of Christ. It was worn by Charlemagne, by Charles V and by Napoleon I.

**Iron Mask**, THE MAN WITH THE, an unknown personage, kept in various French prisons, who for a long time excited much curiosity. All that is known of him is that he was above middle height, of a fine and noble figure and delicate brownish skin; that he had a pleasant voice, was well educated and fond of reading and guitar playing, and that he died in the Bastille in 1703. The mask he wore seems to have been of black velvet, not iron. Conjecture has given him many names, but no assertion ever made regarding him has been able to stand the test of thorough investigation.

**Iron Mountain**, a hill in Saint François co., Missouri, 81 mi. s. of Saint Louis. It is 1097 feet above the sea. This mountain consists mainly of porphyry, traversed by an iron ore which is one of the purest and richest ores in the United States.

**Iron Mountain**, MICH., the county-seat of Dickinson co., 47 mi. s. w. of Marquette, on the Menominee River and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. The city is in the vicinity of large iron mines and also has manufactures of mining and agricultural implements. The place was settled in 1879. Population in 1910, 9216.

**Ironsides**. See CROMWELL, OLIVER.

**Ironsides**, OLD. See CONSTITUTION, THE.

**Ironton**, *i'urn ton*, OHIO, the county-seat of Lawrence co., 140 mi. s. e. of Cincinnati, on the Ohio River and on the Cincinnati, Hamilton & Dayton, the Norfolk & Western and several other railroads. The Chesapeake & Ohio also makes connection from the other side of the river. The city is in a region rich in iron ore, coal and pottery clay, and it has extensive manufactures of iron, cement, lumber, machinery, furniture and other articles. The important buildings are Memorial Hall, Masonic Temple, Odd Fellows' Hall, Briggs Public Library and Kingsbury School. The place was settled in 1832 and was incorporated in 1849. Population in 1910, 13,147.

**Ironwood**, *i'urn wood*, a name given to various trees, from the quality of their timber. The ironwood, or hop hornbeam, of America, is a tree with a trunk not exceeding six inches in diameter, with very hard wood, so heavy that it sinks in water, and with foliage resembling that of birch. Other trees known as ironwood are natives of various parts of the world. Ebony is also called ironwood.

## Ironwood

**Ironwood**, MICH., a city in Gogebic co., 150 mi. w. of Marquette, on the Montreal River and on the Chicago & Northwestern and the Wisconsin Central railroads. It is in the Gogebic iron region, and mining and lumbering are the principal industries. Ironwood has a fine city hall, a high school and a Carnegie library. Population in 1910, 12,821.

**Iroquoian**, *ir'ō kwoi'an*, **Indians**. The tribes belonging to this group held the land lying along the Saint Lawrence River from the coast to Lake Huron and south through the greater portion of New York and Pennsylvania. They tilled the soil, raising many vegetables, much tobacco and maize. Their houses were substantially built of split timber, and their respect for law and family ties gave them a strong organization. The name Iroquoian was originally applied by Champlain to the five tribes which had formed a league for mutual protection (See FIVE NATIONS, THE). The Huron, though of Iroquoian stock, never belonged to the confederacy, were continually at war with the Five Nations, and were finally driven out of southern Ontario, their ancient home. Champlain took the part of the Huron, and in doing so he aroused the enmity of the Five Nations against the French—an enmity which was largely responsible for driving the French from their northern possessions. During the American Revolution the Iroquois sided with the English until they were thoroughly defeated by General Sullivan. There are now in the United States and Canada about 40,000 Iroquoian Indians, of whom the Cherokee is the largest tribe. See CHEROKEE; HURON; MOHAWK; FIVE NATIONS.

**Irrawaddy**, *ir'a wah'dy*. See IRAWADI.

**Ir'riga'tion**, the process of supplying agricultural lands with water by artificial means. Irrigation is one of the oldest of the agricultural arts. It was by this means that the Egyptians obtained the water for their crops in the valley of the Nile, and that method has been continued in Egypt from the remotest time to the present. The Chinese, Hindus and other peoples of the East have also practiced irrigation since long before the dawn of the Christian era. In Egypt recent irrigation works have been constructed which are among the greatest of modern engineering feats. These are the dams across the Nile at Assuan and Assuit. The dam at Assuan is about a mile and a quarter long, 144 feet high and contains 180 sluices. The reservoir formed has a depth of about 66 feet and is large enough to store all the flood water of the Nile from

## Irrigation

December till the following period of high water. The second dam is somewhat smaller than the first. The construction of these dams has increased the irrigable area of Egypt over 6,000,000 acres.

UNITED STATES. Irrigation in America was first practiced by the Indians who inhabited the arid regions of the United States and Mexico. When discovered by the Spaniards, these people, by their rude methods of irrigation, were supplying small patches of land with sufficient water to enable them to raise enough maize and vegetables for their subsistence. The early Spanish missionaries in Southern California and New Mexico adopted the Indian's idea for supplying moisture to the soil and improved upon his methods. The missionary was followed by the miner, who, when he failed in the search for gold, turned his attention to agriculture and soon discovered the unusual fertility of the soil and the adaptability of the climate to a great variety of products. The Mormons, compelled by the force of circumstances, first demonstrated the practical utility of irrigation on an extended scale in Utah. Their plan was a little later adopted in developing the Greeley Colony in Colorado and has since in modified forms been extended to numerous other localities.

Irrigation, thus early employed in the arid regions of the southwest, has grown in favor and extent with the development of the country and has contributed in no small degree to the agricultural prosperity of the sections where it is practiced. It is now extensively used in all of the states whose annual rainfall is insufficient for the successful growing of crops.

Irrigation is necessary under the following conditions:

1. When the annual rainfall is less than 20 inches.
2. When the annual rainfall, though sufficient for agricultural purposes, is unevenly distributed through the year, the greater portion occurring in months when crops cannot be grown.
3. In the growing of such crops as rice, which require the land to be flooded.

These conditions often render irrigation necessary in regions generally known as humid, and they account for the irrigated districts in Texas, Louisiana and other southern states where rice is grown.

Irrigation requires three lines of work:

1. Conserving the amount of rainfall around the sources of rivers which are used to water the arid regions. This is the work of the state and



## Irrigation

national governments and is one of the principal reasons for creating forest reserves. See FORESTRY.

2. The saving of water from melting snow and that which causes the overflow of streams during the rainy season. This requires the construction of numerous reservoirs and often involves expense too great for profitable investment of private capital.

3. Distribution of water to the irrigated districts. This is accomplished through systems of canals. One main channel conducts the water through the irrigated district, and from this small canals branch off at frequent intervals. From these, small canals, ditches and small channels distribute the water to all parts of the field. The plan for obtaining the water from its source depends upon the source of supply and the topography of the country. Whenever possible, streams are tapped by the canals, as this is the least expensive method. In many localities dams are constructed for the purpose of making reservoirs in which to store the surplus water for use during the dry season, or to divert the water of a stream from its original channel into the canals. In other localities the water has to be pumped to the height of several thousand feet in order to reach the irrigated surface. In some sections of Arizona and other localities, the water is obtained from artesian wells. When possible, the wells are so located as to do away with the necessity of canals and large ditches.

Irrigation is available for small farms only and is suited to intensive farming, such as fruit growing. In some instances cereals can be raised with profit by irrigation, and in some localities it is resorted to for the purpose of growing forage plants. The average size of the irrigated farm in the United States is 68 acres. In Utah it is 27 acres, and in the fruit-growing regions of California many of the farms are from 10 to 20 acres each. The income from irrigated lands ranges from \$10 to \$20 an acre, being \$15 for the irrigated district as a whole. The value of irrigated land ranges from \$50 to \$1000 per acre, according to location and products. Only from one-fifth to one-third of the land upon which irrigation is practiced is actually watered, there being an insufficient supply of water for the remainder.

**GOVERNMENT AID.** Since 1894 most irrigation projects have been carried on under one of two laws, the Carey Act, passed in 1894, and the Reclamation Law of 1902.

*The Carey Act.* This act grants to each of

## Irrigation

the states in the arid region, 1,000,000 acres of desert land, on condition of its reclamation. The national government has no further control over this land after it is granted to the State. Most of the projects undertaken upon the lands thus appropriated have been under private enterprise, the parties entering into contract with the state to reclaim a certain area. Under this law nearly 1,900,000 acres have been reclaimed.

*The Reclamation Act.* This act was passed by Congress in 1902. It contains the following important provisions:

1. The creation of a reclamation fund which shall consist of the proceeds of the sales of public lands in the sixteen arid or semi-arid states and territories, this fund to be held in the treasury of the United States.

2. The establishment of a reclamation service in the United States Geological Survey, to investigate and report on the irrigation projects for the approval of the secretary of the interior, under whose authority construction may be authorized and contracts let.

3. The return to the fund of the actual cost of each project by the sale of water rights, the payments to be made in installments running over a period of ten years.

4. The holding of public lands for actual settlers, under the Homestead Act, in small units sufficient to support a family.

5. The sale of water rights to private land-owners, restricting this to not more than 160 acres to each owner, thus making land monopoly impossible.

6. The final turning over to the people of the irrigation works, except the reservoirs, to be operated and managed by them under a system of home rule. By this provision the users of the water within ten years of the completion of the works will have repaid to the government the amount such works cost, without interest, and the money so returned can be used again and again in the construction of other works.

Since this law became effective twenty-eight projects have been undertaken by the government, and are now wholly or partially completed. The distribution of the reclaimed areas is as follows: Arizona, California, Kansas, Nevada, North Dakota, Oregon, South Dakota and Utah contain one each; Colorado and Idaho have two each; Montana and New Mexico, three; Washington four, and five areas are divided by state boundaries. The total area reclaimed is about 2,000,000 acres.







ROOSEVELT DAM, IN SALT RIVER VALLEY, ARIZONA

## Irving

A faint idea of the magnitude of these works can be obtained from a very brief description of the few most important ones. One of the largest of these is the Roosevelt Dam, completed in 1911, across the Salt River in Arizona. This dam is 235 feet long at the bottom and 1080 feet at the top. It rises 283 feet above the foundations, and the height of water against the wall is 230 feet. The reservoir formed by this dam contains sufficient water to cover 1,000,000 acres of land to the depth of one foot. A second great project is the Truckee-Carson. The main canal, built at a cost of \$1,250,000 is 31 miles long, and diverts the entire flow of the Truckee River into the bed of the Carson. A large reservoir, Lake Tahoe, and ditches and smaller reservoirs, greatly extend the usefulness of this irrigating system. In the Gunnison project in Colorado the construction of a tunnel six miles long under a mountain over 2,000 feet high was necessary. This tunnel, which is the largest single irrigation project ever undertaken by the United States government, carries water from the Gunnison River to Uncompaghre Valley. The Shoshone project in Wyoming is another of the larger enterprises of the government. The entire expense of the projects undertaken is estimated at seven times the cost of the Panama Canal, but the reclamation of these lands will add over \$2,350,000,000 to the taxable property of the United States. See AGRICULTURE, sub-head *Irrigation*, Volume V.

**Irving**, *ur'ving*, HENRY, Sir (1838-1905), an English actor, born in Somersetshire. His name was originally John Henry Brodribb, but the name Irving, which he assumed as a stage name, was legalized by royal license. For a time Irving was a clerk in London, but in 1856 he adopted the theatrical profession. For some years he met with no success, but at length in various light comedy parts he attracted some attention, and in 1870 he gained a real triumph in *The Two Roses*. With his presentation of Matthias in *The Bells* and the title rôles of *Eugene Aram*, *Hamlet*, *Macbeth*, *Richelieu* and *Othello* his fame steadily rose. In 1878 he leased the Lyceum Theater for himself, and with Ellen Terry as his leading actress he soon won recognition as the greatest of living English actors. In his repeated visits to the United States, both alone and with Miss Terry, he met with the most enthusiastic receptions. Besides the characters named, Irving appeared as Shylock, Mephistopheles, Robespierre, Benedick in *Much Ado About Nothing*, and in the title rôle of Tennyson's

## Irving

*Becket*. It was but a few hours after a presentation of this last play that Irving died. As an actor of great intellectual power, Irving ranks with the foremost of all English actors.



WASHINGTON IRVING

In emotional strength and fire he was somewhat deficient, however, and this prevented his attaining a high place among the greatest actors of all time.

**Irving**, WASHINGTON (1783-1859), a famous American author, born in New York City. He was educated for the legal profession, but his tastes were in the direction of literature, and as early as 1802 his *Letters of Jonathan Oldstyle* appeared in the *New York Morning Chronicle*. Shortly afterward, being threatened with lung trouble, he sailed for Europe, visited most Continental countries and did not return to America until March, 1806. In the same year he was called to the New York bar. His pen was now very busy, and his sketches of Dutch character, in his *Knickerbocker's History of New York*, which made its appearance in December, 1809, proved him possessed of quaint and genial humor to a high degree. About this time he joined his two brothers in a mercantile venture, and the failure of this business, while he was in London in 1818, threw upon him the burden of his own support and the support of his brothers, as well. He settled in London, where his previous literary work secured his warm reception, and devoted himself entirely to literature, which up to this time he had scarcely regarded as a means of live-



## Irvington

lihood. His first publication, *Geoffrey Crayon's Sketch Book*, which contained the now classic *Rip Van Winkle* and *Legend of Sleepy Hollow*, became immediately popular. For seventeen years, until 1832, Irving resided in Europe, principally in England, France and Spain. This was a period of great literary activity and brought forth some of his most famous works, such as *Bracebridge Hall*, the *Tales of a Traveler*, the *Life of Columbus* and *The Alhambra*. He also acted for a time as secretary to the American embassy in London.

In 1832 Irving returned to the United States and was proudly welcomed as the first man who had secured recognition in Europe for American literature. He bought a country-seat on the Hudson, near the Sleepy Hollow, which he had made famous, and here, at "Sunnyside," as he named it, he spent the remainder of his life, except the four years when he served as ambassador to Spain. The chief works of the period before his departure for Spain are *A Tour of the Prairies* and *Captain Bonneville*. He had planned a history of Mexico; had collected much material and had written one chapter; but he learned that Prescott was planning the same work and he magnanimously abandoned his intentions. After his return to "Sunnyside," Irving produced his *Life of Goldsmith*, a sympathetic biography which he was peculiarly fitted to write, by reason of the resemblance of his kindly genius to Goldsmith's own; and he also wrote the affectionate and impartial *Life of Washington*. This is the last work which he finished.

Irving's last years at his beloved "Sunnyside" were serene and happy years. He took no part in public life, but his character won him a place in the affections of the whole nation. His generous nature, his optimism, his loyalty to truth and right are evident in his works and make it easy for us to understand the esteem in which he was held by his contemporaries.

**Irvington**, N. J., a town in Essex co., adjoining Newark on the southwest. It is a pleasant residence suburb and also contains smelting works, wall paper mills and tool, brush and other factories. The place was settled about 1660, but was not incorporated as a town until 1898. Population in 1910, 11,877.

**Isaac**, *i'zak*, (he will laugh), so called to denote the laughter and gladness occasioned by his birth. Isaac was one of the Hebrew patriarchs, the son of Abraham, by Sarah. He

## Ischia

is remarkable as the offspring of very old age, Sarah being ninety and Abraham a hundred years old at the time of his birth; for his miraculous escape from death as a burnt offering, and for the fraud perpetrated upon him, at his wife Rebecca's instigation, by his son Jacob. He died at Hebron when 180 years old and was buried in the cave of Machpelah, the resting place of Sarah, Abraham and Rebecca.

**Isabella II**, *iz a bel'la*, (1830-1904), queen of Spain, daughter of Ferdinand VII, was made queen on the death of her father in 1833, with her mother as regent. The early years of her reign were disturbed by a rising in favor of her uncle, Don Carlos, who, if the Salic law had not been set aside, would have ascended the throne instead of her; but this was finally quelled in 1840. She was declared of age in 1843, and her rule was at the outset very popular. Soon, however, she became so despotic that various risings took place, and in 1868 she was driven from the country. She resigned her claims to the crown in favor of her son Alfonso, who ascended the throne in 1875. She lived sometimes in Spain, sometimes in Paris, where she died.

**Isabella of Castile** (1451-1504), queen of Castile, daughter of John II of Castile and Leon, and wife of Ferdinand of Aragon. She was a woman of great courage and sagacity and contributed no small share to the many remarkable events of the reign of Ferdinand V, including the introduction of the Inquisition, the discovery of America by Columbus and the final expulsion of the Moors after the conquest of Granada. See FERDINAND V.

**Isaiah**, *i za'ya* (salvation of Jehovah), the first of the great Hebrew prophets. He began his predictions in the last year of Uzziah's reign. Of his father, Amoz, we know nothing, and of the circumstances of his own life, but little. He had great influence over the kings and people of Judah, and he is supposed to have died at a good old age in Jerusalem at the beginning of Manasseh's reign. The first portion of the writings that pass under his name consists chiefly of declarations of sins and threatenings of judgments, while the last twenty-seven chapters, together with some previous ones, hold out promises of a glorious future for Israel.

**Ischia**, *ees'ke ah*, an island in the Mediterranean Sea, belonging to Italy, in the Gulf of Naples, 16 mi. s. w. of Naples. It has beautiful scenery and a fertile soil, producing excellent wine and fruits. It is entirely volcanic in char-

acter and is noted for its warm mineral springs and volcanic convulsions. The capital, Ischia, with about 7000 inhabitants, is a favorite resort of tourists in Italy. Other towns are Casamicciola and Forio, both of which suffered severely from an earthquake in 1883. Population, 26,891.

**Isfahan**, *is fa hahn'*. See ISPAHAN.

**Ishmael**, *ish'ma el*, (whom God hears), the son of Abraham, by Hagar (*Gen.* xxi, 8-21). He married an Egyptian wife and had twelve sons and one daughter, who became the wife of Esau. His descendants are Ishmaelites.

**Ish'peming**, MICH., a city in Marquette co., 15 mi. w. of Marquette, on the Chicago & Northwestern, the Duluth, South Shore & Atlantic and other railroads. It is in the great Lake Superior iron region and has important smelting works, foundries and machine shops. Marble is also found in the vicinity. The place was settled about 1857 and was chartered as a city in 1873. Population in 1910, 12,448.

**Isinglass**, *i'zin glas*, a gelatinous substance, of which the best kind is prepared from the air bladder of the sturgeon, dried and cut into fine shreds. The American article is obtained from the same organ in the cod, hake and other fish. Isinglass is the basis of the Russian glue, which is preferred to all other kinds for strength. Boiled in milk isinglass makes a nutritious jelly; mixed with other substances and spread on silk it forms courtplaster; with brandy it makes a cement for porcelain and glass.

**I'sis**, the principal goddess of the Egyptians, the sister and wife of Osiris. Isis represented the moon, as Osiris did the sun. The Egyptians believed that Isis first taught them agriculture, and as the Greeks offered the first ears gathered to Ceres, so the Egyptians offered the first to Isis. She is represented under various forms: a woman, with the horns of a cow, as the cow was sacred to her; as crowned with a sun's disk; as bearing upon her head her emblem, the throne. She is also known by the attributes of the lotus on her head and the sistrum, a musical instrument, in her hand. She is often accompanied by her infant son Horus. In one celebrated Egyptian statue she was shown with her face veiled. She was particularly worshiped in Memphis, but at a later period throughout all Egypt. From Egypt her worship passed over to Greece and Rome, and the abuses which it occasioned at Rome caused its frequent prohibition there, but it was repeatedly revived. The Romans never considered the worship,

which was introduced among them by Sulla. 86 B. C., altogether reputable, and its attendant immorality was vigorously lashed in the satire of Juvenal.

**Islam**, *iz'lam*, that is, complete resignation and submission to the will of God, is the name given in Arabic to the religion originated by Mohammed. The fundamental doctrine of Islamism, the only one it is necessary to profess to be a Moslem, is expressed in the common formula of faith: "There is no God but Allah, and Mohammed is his prophet," to which the Shiahs or Shiites, the majority of Persian and Indian Moslems, add "and Ali is the vicar of God."

**Island**, *i'land*, a portion of land entirely surrounded by water, smaller in size than the great masses of land known as continents. Islands are of all sizes, from mere dots of land or rock in the sea to great masses like Borneo and Cuba. Islands are divided into two distinct classes: *continental* islands, lying in proximity to continents, and *pelagic*, or *oceanic*, islands, from their position in the oceans. Continental islands occur along the margins of the continents and are generally of the same geological structure. Oceanic islands are mostly of volcanic or coral formation. A cluster of islands, such as the West Indies, the Canaries or the Hebrides, is called an *archipelago*.

**Island Number 10**, an island which, until about 1866, existed in the Mississippi River at about the boundary line between Kentucky and Tennessee. It was an important Confederate post after the fall of Forts Henry and Donelson and was commanded by General McKall. In March, 1862, the Federals under Pope, assisted by a fleet under Commodore Foote, proceeded against the position, captured New Madrid and bombarded the fort on Island Number 10, but without success. Finally, through the construction of a channel across the peninsula formed by a loop in the river at this point, the Federals were able to strike the Confederates in the rear and thus cut off their retreat. On April 7 the garrison of about seven thousand surrendered. The island was gradually washed away by the river.

**Islands of the Blessed**, according to the Grecian mythology, were islands lying far to the westward, where the favorites of Jupiter, rescued from death, lived in perpetual happiness.

**Isle of Pines** (Isla de Pinos), an island of the West Indies, lying 35 mi. s. of the western portion of Cuba, to which it belongs. It is 40



## Isle of Wight

miles by 34, with an area of 1214 square miles. The surface is hilly and is covered with forests of pine, cedar and mahogany. There are some mineral deposits, marble being the most important. The chief industry is cattle raising. The capital is Nueva Gerona, and another town of note is Santa Fé, a health resort. Population, 3199.

**Isle of Wight**, *wite*. See WIGHT, ISLE OF.

**Isle Royale**, a group of islands in Lake Superior, forming part of Houghton County, Mich. The most important settlement on the islands is Minong.

**Isles of Shoals**, *shohlz*, a group of eight rocky islands in the Atlantic Ocean, 10 mi. s. e. of Portsmouth, N. H. The two largest are Appledore, covering 400 acres, and Star, 150 acres. On Wight Island is a revolving light 87 feet above the sea. The islands are much visited by summer tourists.

**Isobars**, *i'so bahrz*, or **Isobaric Lines**, lines on weather charts, connecting places having equal barometric pressure. Isobars are used in the construction of weather maps and enable meteorologists to obtain a definite knowledge of those regions having the same monthly and yearly atmospheric pressure. From this knowledge they are able to formulate many principles upon which the circulation of the atmosphere is based, and charts of this nature are of the greatest importance in forecasting the weather. See METEOROLOGY.

**Isocrates**, *i sok'ra teez*, (436-338 B. C.), an Athenian philosopher and orator. He was one of the most famous of the Sophists and contended that man cannot expect to gain truth itself, but must be content with appearances. The orations and essays of Isocrates are among the most famous of Greek prose and were the models on which Cicero formed his style.

**Isomerism**, *i som'ur iz'm*. It is sometimes found that two different chemical compounds have very different properties, and yet the molecules of the substances are composed of the same atoms and the same number of atoms. Such compounds are said to be isomeric; one is an isomer of the other, and the phenomenon is called isomerism. Such cases are very numerous among the compounds of carbon.

**Isothermals**, *i'so thurm'alz*, or **Isotherms**, lines used upon maps to connect places having the same temperature. Isothermals are used especially by meteorologists in the construction of weather charts, and enable them to determine the areas of mean monthly and annual tempera-

## Isthmus

ture. These lines are also used by the general geographer, as they enable him to convey similar knowledge to his readers. See METEOROLOGY, WEATHER BUREAU.

**Ispahan**, *ees pa hahn'*, or **Isfahan**, a very ancient city of Persia, for centuries its capital, in the province of Irak-Ajemi, on the river Zendarud, 210 mi. s. of Teheran, the present Persian capital. It was once one of the most important and magnificent cities in the East, but little is now left of its former splendor, the largest part of the city being in ruins. Among the chief structures, some of which are the finest in the East, are a magnificent bridge, having a double row of 34 arches; the palace known as the Tchehl Situn, or Forty Pillars, built by Abbas the Great, and the Mesjid-Shah, or royal mosque. The manufactures are still extensive, including trinkets, firearms, sword blades, glass, earthenware, artistic brass-work, woollens, cottons, velvet and satin. Much opium is grown in the neighborhood; also tobacco and madder. Ispahan is the center of the inland commerce of Persia. Population, about 80,000.

**Israelites**, *iz'ra el ites*. See JEWS.

**Israels**, *ees ra ayls'*, JOSEF (1824-1911), a Dutch genre painter, born in Holland of Jewish parents. He first studied at Amsterdam and later at Paris, under Delaroche. The first important pictures he produced were *The Cradle* and *The Shipwrecked Mariner*, both of which brought him renown. Other works are *Expectation*, *The Frugal Meal*, *Alone in the World*, *David before Saul* and *The Toilers of the Sea*.

**Isthmian**, *is'me an*, **Canal**. See NICARAGUA CANAL; PANAMA CANAL.

**Isthmian Games**, public games of ancient Greece, so called because they were celebrated on the Isthmus of Corinth. They had a similar character to the Olympian, Nemean and Pythian games. The Greeks in general took part in them, and the principal exercises were boxing, wrestling, foot, horse and chariot racing, and throwing the discus. They were celebrated in April and May, in the first and third year of each Olympiad, and the victors were rewarded with wreaths of pine leaves. The origin of these games was lost in antiquity, but they were generally regarded as having originated in honor of Poseidon (Neptune).

**Isthmus**, *is'mus*, one of the natural divisions of land, a neck of land by which two continents are connected or by which a peninsula is united

## Istria

to the mainland. Such are the Isthmus of Panama, connecting North and South America; the Isthmus of Corinth, connecting the Morea with Northern Greece.

**Is'tria**, a peninsula of triangular form, projecting into the northeast corner of the Adriatic Sea, part of the Austro-Hungarian dominions. The surface is mountainous, particularly in the north. Istria is rich in wine and oil and has extensive forests, which yield excellent timber. The principal towns are Pola and Rovigno and the capital is Parenzo. Population in 1910, 403,261.

**Ital'ian Language.** The Italian language is descended from the Latin through the intermediate stage of the so-called "rustic Latin." This is the name given to the corrupt dialects of the uneducated, which arose after the fall of Rome and the consequent disuse of the language as a standard of literature. The dialects had existed before, but they became predominant only under favoring circumstances. In the twelfth and thirteenth centuries, the poets, especially those of Tuscany, employed Italian, the natural result being that their dialect took precedence over the others. Dante (1265-1321) did much to arrange and consolidate the various elements, and thus, long before most other European languages had reached their full development, Italian received substantially the form it has to-day. In the fourteenth century the language was further perfected by Petrarch and Boccaccio, and in the late fifteenth and early sixteenth centuries prose form became fixed and elaborated in the works of Leonardo da Vinci and Machiavelli. Italy has now a uniform written language, but the spoken dialects differ widely, sometimes as much as utterly different tongues. The standard aimed at by educated Italians is a combination of the pure Tuscan dialect with the pronunciation of Rome. The broad vowels and the vast preponderance of vowel-endings give to Italian a particularly musical character. This makes it well adapted for singing. The poetic structure of the language, in choice of words and pronunciation, differs more widely from the prose than that of any other European language. The vocabulary is rich in poetic words and in such as were received from classical sources, but in the expression of material things in modern life it is singularly poor.

**It'aly**, a kingdom of southern Europe, consisting of the peninsula of the same name, with the islands of Sicily and Sardinia and a number of smaller islands. The continental portion

## Italy

extends from 38° to 46° 40' north latitude and from 6° 32' to 18° 32' east longitude. Its greatest length is 718 miles and its width varies from 90 to 350 miles. Exclusive of the islands, its area is about 91,000 square miles, and to this the islands add 19,684 square miles. Its total area is thus about the same as that of the State of Nevada. The peninsula of Italy is bounded on the east by Austria and the Adriatic and Ionian seas; on the southwest and south by the Tyrrhenian and Ligurian seas; on the west by France, and on the north by Switzerland and Austria. The dividing line between Italy and Switzerland is considerably to the south of the central part of the great range of the Alps which cuts off Italy from the rest of the continent. With the island of Sicily, from which it is separated only by the narrow Strait of Messina, Italy reaches almost across the Mediterranean Sea and is thus commercially in a very favorable location.

**SURFACE AND DRAINAGE.** There is in Italy only one large plain, the valley of the Po, in the northern part of the country. This plain is about 37,000 square miles in area and is well-nigh surrounded by a great curve of the Alps. The mountains of the country may be separated into three divisions: the Alps in the northern part; the Apennines, which are about 800 miles in length and extend through the central part of the peninsula, dividing it into two slopes, a western and an eastern (See APENNINES, THE); and the chain which runs parallel to the Apennines in Sardinia and Corsica. Mount Vesuvius, on the Bay of Naples, is the only active volcano on the continent of Europe, while Mount Etna, in the Sicilian continuation of the Apennines, is the loftiest volcano of Europe.

The coast line of the peninsula of Italy is about 2270 miles long, and that of the islands is about 1940. While the country is well watered, there is but one large river, the Po (See Po), which is navigable as far as Turin. Of the other rivers, among which may be mentioned the Tagliamento, the Brenta, the Adige, the Arno and the Tiber, many are but torrents, the beds of which are dry in the summer. Some of the largest mountain lakes of Europe are located in Italy. The Alpine lakes of Maggiore, Lugano and Garda lie only partly in Italy, but Como and Iseo are entirely Italian. The Apennines also contain numerous lakes, many of which seem to have been formed in the craters of extinct volcanoes. Among these Apennine lakes are Trasimeno, Bolsena, Albano and Averno.



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**CLIMATE.** There are in the climate of Italy considerable variations. The southern part of the peninsula, with its arid, burning climate and its sirocco winds, resembles Africa rather than Europe, while the northern parts have a climate which is practically that of central Europe. The latitude of the country (Naples is in the same latitude as New York City) has considerably less to do with the climate than have the local conditions, the nearness to the sea and the protection afforded on the northern boundary by the Alps. In general, the most noteworthy features of the climate consist in the absence of extremes of heat and cold and the clearness of the air. This latter peculiarity accounts for the remarkable blueness of the Italian skies. For the most part Italy is healthful, although there are exceptions in the pestilential marshes, the most notable of which are the Maremme in Tuscany, the Campagna of Rome and the Pontine marshes. The rainfall is considerable during the winter, but irrigation is necessary in most parts of the country.

**MINERAL RESOURCES.** The mineral industries of Italy are few. Coal is almost entirely lacking, and this prevents the thorough working of such mineral beds as are found. Iron ore is found in some localities. Zinc is mined in Lombardy and Sardinia, and limited quantities of gold, silver and antimony are produced. Sulphur is by far the most important mineral found in the country, and almost all of the world's supply of this mineral is obtained from Italy. The famous Carrara marble, which is largely exported, is found in the Apennines.

**AGRICULTURE.** Agriculture is distinctly the most important industry of Italy, and the range of latitude and altitude permits the production of all the crops of the temperate regions and many tropical products as well. The length of the warm season in many parts of the country makes possible the raising of two or even three crops during the year. The great plain of Lombardy is the most important agricultural district. Wheat is the principal cereal raised, but there is not enough to supply the domestic need, and large annual importations are necessary. Corn also is raised in all parts of the kingdom, and rice is grown for export, as well as for home consumption. The fruits of Italy are more important than the cereals, and olives, in the production of which Italy leads the world, are the most important agricultural product. Immense quantities of oranges and lemons are grown; almonds are produced in southern Italy and in Sicily, and in the production of wines Italy ranks next to

## Italy

France. The climate in the northern part is peculiarly adapted to the growth of silkworms, and their cultivation is the most important single industry in the country, Italy being one of the leading countries of the world in the production of silk (See **SILK**).

Little has been done in stock raising, but in the northern part of the country horses and horned cattle are bred to a limited extent.

From the richness of the soil and the favorableness of the climate it might be expected that Italian farmers would constitute a well-to-do class of people. They are, on the contrary, very poor, for the most part, and receive but a small proportional return for their labors. This is accounted for chiefly by the fact that much of the land is owned by wealthy landlords, who rent it out on terms most disadvantageous to the tenants.

**MANUFACTURES.** The manufactures include silk, which is made chiefly in Lombardy and Piedmont, woolens, straw goods, coral ornaments, mosaics, jewelry, ivory carvings and marble and alabaster products. The Italians have a special aptitude for art work, and the most of the exports of the country consist of such articles. Macaroni, which is produced in large quantities, is largely consumed at home. In the northern districts, dairy products form a large part of the manufactures, and certain varieties of cheese, especially Gorgonzola and Parmesan, are famous.

**TRANSPORTATION AND COMMERCE.** There are about 10,000 miles of railway in operation in Italy. The railways are organized into two trunk lines, one on either side of the Apennines, known respectively as the Mediterranean and the Adriatic groups. The extensive coast line of Italy and the fact that all Mediterranean ports and most ports of the East are easily reached, have given Italy a large carrying trade, and the country has a large merchant marine.

In its commerce, Italy is behind any other important European power. The imports have of late years somewhat exceeded the exports. In the foreign trade with Italy, Germany ranks first, the United States next, then Great Britain, France and Austria-Hungary. The exports from Italy to the United States consist largely of art goods, Carrara marble, olive oil and straw goods, while the United States sends to Italy cotton, agricultural implements, machinery and hardware.

**INHABITANTS AND LANGUAGE.** The population of Italy is more homogeneous than that of almost any other large country. There are, of

course, in Italy numerous representatives of all the other European countries, but their proportion to the native Italians is remarkably small. For the language of Italy, see ITALIAN LANGUAGE.

**EDUCATION.** By a law passed in 1877 compulsory education was provided for all children between six and nine years of age. The law is not strictly enforced in many of the provinces, and the proportion of illiterates is still very high. There are still provinces where three-fourths of the population can neither read nor write. The system of higher schools is remarkably efficient, considering the low educational status of the population in general. There are twenty-one universities, of which the state maintains seventeen. The University of Bologna is the oldest of the state universities, and that at Naples, with an enrollment of over 5000 students, is the largest. There are numerous normal schools and a system of secondary schools comprising both technical and classical schools. There are also more than twenty-five art institutions, besides six government and a number of private musical conservatories.

**LITERATURE AND ART.** See LITERATURE, subheads *Latin Literature* and *Italian Literature*; PAINTING; SCULPTURE, subhead *Italy*; ARCHITECTURE, subhead *Renaissance Architecture*.

**GOVERNMENT AND RELIGION.** The government of Italy is a constitutional hereditary monarchy. The royal family is that of Savoy. The king has the power to appoint all officers, may veto any project of law and has the power to grant pardons. He is assisted by a council of responsible ministers. There are at present eleven of these, at the head, respectively, of the departments of interior; foreign affairs; treasury; finance; justice and religion; war; marine; commerce, industry and agriculture; public instruction; posts and telegraphs, and public works. The legislative power is vested in a parliament, which consists of a Senate and a Chamber of Deputies. The Senate is composed of the princes of the blood and an indefinite number of notables appointed by the king for life. Usually the Senate has about 320 members. There are 508 members in the Chamber of Deputies, and they are elected for a term of five years. The only qualification of the franchise is a slight property limitation, or the ability to read and write and to pass an examination in the elementary branches of the school curriculum. Men in the army or the navy cannot vote.

The Roman Catholic religion is the religion of

almost all of the inhabitants of Italy. It has an importance here which it has not in other countries, because Rome, the capital of Italy, is the center of the Church. According to the last statistics, the Jews and Protestants together in Italy numbered only about 100,000.

**COLONIES.** Italy's dependencies in Africa are Tripoli, Eritrea and Italian Somaliland. Tripoli is the largest and most important colony. The colonies have an area of about 495,000 square miles, and a population, which is partly nomadic, of about 1,400,000.

**CITIES.** The chief cities of Italy are Rome, the capital, Naples, Milan, Turin and Palermo, all of which are described under their titles.

**HISTORY.** The ancient history of Italy belongs properly under that of Rome. Before the period of Roman supremacy, the country was peopled by various Italic tribes, among which were the Etruscans, or Tuscans, the Umbrians, the Sabines and the Latins. The last-named became supreme and gave their name to the ancient race and language. With the fall of Rome, in 476 A. D., begins the history of Italy proper. The invading barbarians proclaimed their leader Odoacer king of Italy, but in 493 they were overthrown by Theodoric the Great, king of the Ostrogoths, who united the whole peninsula under Gothic rule and proved himself a wise and benevolent king. Italy had not seen such prosperity since the earlier glory of the Roman state.

In 552 the Ostrogoths were vanquished by the army of the Eastern emperor Justinian, under the famous general Belisarius, and Italy became an exarchate of the government at Constantinople. After the recall of Narses, the first governor, the Lombards, a Germanic tribe, invaded Italy, introduced Germanic feudal institutions and greatly modified the political and social life of the country. About the middle of the eighth century, the Lombards threatened Rome, but were defeated by Pippin, king of the Franks, whose aid had been asked by the pope. Certain territory was given to the pope by Pippin, and this gift was confirmed by Charlemagne, who conquered the Lombards and annexed their country to the Frankish kingdom in 774. This gift to the pope was the beginning of the temporal power of the Church.

In 800 Charlemagne was crowned Roman emperor by the pope, and the assumption of this title led to the claims of the German emperors in Italy during the following centuries. By the Treaty of Verdun (843), Italy fell to



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Lothair, and for over a century anarchy reigned throughout Italy, but in 951 Otho the Great reduced the Lombard king to vassalage, and in 961 Otho himself assumed the crown of the Lombards. In the following year he was crowned emperor, thus founding the Holy Roman Empire. The rule of the Germans was never acceptable to the Italians, and from the beginning of the eleventh century frequent revolts occurred against the German emperors, who with difficulty maintained their authority. The Lombard kingdom was gradually resolved into city states, such as Milan, Genoa, Pisa, Florence and Venice. During the eleventh and twelfth centuries arose the famous factions of the Guelphs and the Ghibellines (See GUELPHS AND Ghibellines), and the emperor Frederick I was compelled to relinquish all rights in the cities of the Lombard League (1183). In the latter half of the thirteenth century the German dynasty was completely overthrown, and the kingdom of the Two Sicilies was secured by Charles of Anjou. Italy was at this time prosperous, but this prosperity was marred by the continued feuds and rivalry of the Guelph and Ghibelline factions.

The Guelphs continued victorious and defeated the attempt of Henry VII to restore German supremacy in Italy (1312). This party, however, was torn by disputes and gradually succumbed to petty tyrants. From the middle of the fourteenth century to the end of the fifteenth, the history of Italy as a whole ceases, and we have only the annals of several powerful cities and the famous families who ruled them (See VENICE; FLORENCE; GENOA; MILAN; NAPLES; ROME; SICILY; PAPAL STATES). The smaller states dwindled into insignificance.

During the early sixteenth century, Italy was the scene of the struggles between France and the German emperors, now represented by the Austrian House of Hapsburg. These struggles began in 1494 with the attempt of Charles VIII of France to conquer Naples. The Battle of Pavia (1525) decided the struggle finally for the German emperors, who thereafter appointed rulers over the several states. Italy enjoyed comparative peace for one hundred fifty years, during which some progress was made toward national consolidation. Charles V in 1535 secured Milan and Naples for Spain, but in the early eighteenth century Austria acquired both, together with Sardinia, which was later exchanged for Sicily. The condition of Italy,

## Italy

nationally, was one of apathy and decay down to the French Revolution.

In 1793 Italy attempted to join the coalition against France and as a result was reduced to the condition of a dependency. By the Treaty of Campo-Formio in 1797 Napoleon surrendered Venice to Austria and transformed the remainder of Italy into republics. In 1806 Naples was made a kingdom for Joseph Bonaparte, who was succeeded two years later by Murat. From 1809 until 1814 Napoleon's supremacy in Italy was undisturbed.

The Congress of Vienna in 1815 left Italy almost entirely in the hands of Austria and the papacy, and the wishes of the Italian people for unity and independence were hopelessly crushed by this restoration of the Austrian and the papal power. Conspiracies and secret societies directed against the foreign rule sprang up almost immediately. The liberal concessions made by Charles Albert after his accession in 1831 to the throne of Sardinia laid the foundation for the ultimate union of Italy under his house. Mazzini made vigorous pleas for national unity, calling upon Charles Albert to act as liberator for his country. The revolution in France in 1848 increased the discontent in Italy, and insurrections were common throughout the country. Naples, Sardinia and Rome were forced to grant constitutional rights, and in Milan the people rose against Austrian rule and compelled the foreign troops to retreat. Charles Albert now entered Lombardy at the head of his army. The pope at first supported the movement, and his subsequent change of position weakened the national cause and the fighting force. Charles Albert was defeated at Novara early in 1849, and reaction was triumphant throughout southern and central Italy. Only in Sardinia were the liberal reforms continued under the new king, Victor Emmanuel (See VICTOR EMMANUEL II; SARDINIA, KINGDOM OF).

Toward the close of 1858 it became evident that Sardinia and France were preparing to ally themselves against Austria, and early in the following year Victor Emmanuel proclaimed his intention to aid in freeing Italy from the Austrian yoke. War began in April, 1859, and the Austrians, after a few smaller engagements, were routed in the great Battle of Magenta, June 4, and compelled to relinquish Milan and north-western Lombardy. They were again defeated at Solferino, after which the French emperor, fearing the interference of Prussia, suddenly concluded the Peace of Villafranca. This proposed

## Itch

a confederation of the Italian states under the pope, but it was rejected by all Italy. In 1860 the duchies of Tuscany, Parma and Modena, whose sovereigns had been driven out, declared for annexation with Sardinia, and Victor Emmanuel was proclaimed king of Italy, March 17, amid great rejoicing. Savoy and Nice were ceded to France to indemnify her for her share in the war. In May began the conquest of the Two Sicilies by Garibaldi (See GARIBALDI, GIUSEPPE), and in November, Victor Emmanuel formally annexed the provinces which had composed this kingdom. In the Seven Weeks' War between Austria and Prussia, Italy was the ally of Prussia, and after the defeat of Austria, Venetia was added to the kingdom of Italy by treaty. In the following year the Italian volunteers under Garibaldi attacked Rome, but Napoleon III refused to permit the annexation of Rome to the kingdom of Italy. When, in 1870, France was forced to withdraw her troops from Rome, for use in the war against Prussia, the government troops entered the city, and in July, 1871, Rome became the capital of United Italy. In 1878 Humbert, son of Victor Emmanuel, succeeded to the throne, and he was succeeded in 1900 by his son, Victor Emmanuel III. In 1911 Italy attacked Turkey for alleged injustice to Italian interests in north Africa; early in 1912 Tripoli became an Italian possession. In 1914, Italy, though under great pressure both from the Allies and from Germany and Austria, refused to take sides in the War of the Nations. Population in 1913, 34,671,377.

**Itch**, a contagious skin disease, appearing as small, watery sacks on the skin, accompanied, with an irritation which inclines the patient to rub or scratch. It usually appears first between the fingers and on the lower side of the wrist. The cause is a small insect, or mite, which burrows under the cuticle. A mixture of lard and sulphur applied externally will kill the insects



ITCH MITE  
Much magnified.

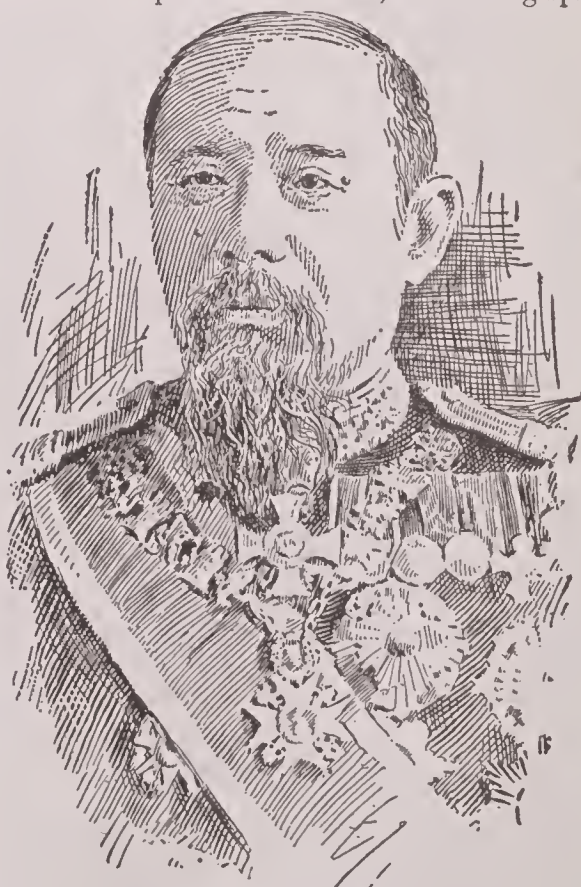
**Ith'aca** (now Thiaki), one of the Ionian Islands, west of Greece, between the mainland and Cephalonia. It is 14 miles long and not more than 4 miles broad. It is rugged and uneven and is divided into two nearly equal parts, connected by a narrow isthmus. The inhabitants are industrious agriculturists and mariners. Ithaca is celebrated as the home of Ulysses, in Homer's *Odyssey*. Schliemann has recently made important excavations and has

## Ito

identified several sites mentioned by Homer. Vathi, the modern capital, trades largely in oil, wine, raisins and currants. Population, 11,000.

**Ithaca**, N. Y., the county-seat of Tompkins co., 60 mi. s. w. of Syracuse, at the head of Cayuga Lake, on the Lackawanna, the Lehigh Valley and other railroads. The city has an especially beautiful location on the shores of the lake and near numerous gorges and waterfalls. Taughan-nock Falls are 215 feet high. Cornell University, which is located here, has one of the most beautiful college campuses in the world, lying 400 feet above the lake and overlooking the city and the water (See CORNELL UNIVERSITY). The Cascadilla Preparatory School, Ithaca Conservatory of Music and Renwick Park are other features of interest. Ithaca is in a productive farming region and has an extensive coal trade. The manufactures include typewriters, machinery, agricultural implements, firearms, glass, wall paper and other articles. The first settlement was made in 1789, and it was variously called The Flats, Sodom and The City, until Simon DeWitt gave the place its present name in 1806. Population in 1910, 14,802.

**Ito**, *ee'to*, HIROBUMI, Marquis (1840-1909), a celebrated Japanese statesman, the leading spirit



MARQUIS HIROBUMI ITO

in the reforms in Japanese civilization and methods of government. He visited the United



## Iturbide

States in 1871 to study our system of coinage, and on his return he established the Japanese mint. He was minister of public works in 1873, and he was prime minister for four terms, the last ending in 1901. He wrote Japan's present constitution and was a leader in the war with China, also in the war with Russia. In 1908 he was appointed Japanese Resident General of Korea, and was virtually ruler of the country. Count Ito was assassinated by a native of Korea at Harbin Oct. 25, 1909. See JAPAN, subhead *History*.

**Iturbide**, *ee toor bee'da*, AGUSTIN DE (1783-1824), an early emperor of Mexico, the son of a Spanish nobleman, born at Valladolid, Spain. He entered the Spanish army in Mexico in 1798, fought against the insurrectionists in 1810 and gained a high post under Spain for his loyalty and bravery. He quit the military service in 1816, but, after the proclamation of the constitution in 1820, as commander of the Spanish army in the south he intrigued with the revolutionary leaders for the acceptance of the so-called "Plan of Iguala," which contemplated independence of Spain under a prince of the royal family. He made a triumphal march to the City of Mexico, where he compelled the viceroy to accept the plan. Pending negotiations with the royal family, he was placed at the head of a ministry and became commander in chief of the army. The national congress was held, but was rent with factional strife, and Iturbide, being accepted by the party in favor of the monarchy, was proclaimed emperor as Agustin I in July, 1822. His harsh repressive measures led to a rebellion under Santa Anna, and Iturbide abdicated, sailing for Italy. In the following year, he returned to Mexico, where a republic had been meantime established, was immediately arrested and was executed at Patola, July 19. See MEXICO, subhead *History*.

**I'van III** (Russian pronunciation, *e vahn'*), called the *Great* (1440-1505), grand prince of Muscovy, came to power in 1462. He greatly enlarged his hereditary possessions and married Sophia, niece of the last Byzantine emperor, thus introducing the double-headed Byzantine eagle into the Russian coat of arms. He may be regarded as the real founder of the Russian Empire.

**Ivan IV**, called the *Terrible* (1530-1584), became grand duke of Russia in 1533. In 1547 he assumed the title of czar. He did much to civilize and improve his people, introduced learned men, artists and mechanics into Russia

## Ivory Coast

and concluded a commercial treaty with England. Nevertheless, the name *Terrible* was well earned, for in war and in dealing with insurrections he was most cruel and blood-thirsty.

**I'vory**, the bone-like substance of which the tusks of the elephant and the teeth or tusks of the hippopotamus, walrus and narwhal are composed. Ivory is esteemed for its beautiful white color, its hardness, the fineness of its grain and its susceptibility of a high polish. That of the African elephant is most esteemed by the manufacturer for its density and whiteness. It is used as a material for knife handles, piano-forte keys, billiard balls and many other small articles. The ivory of the hippopotamus is preferred by the dentist, being free from grain and much harder and of a purer white than that of the elephant. The shavings and sawdust of ivory may by burning be converted into a black powder, named *ivory black*. Ivory may be stained or dyed; a black color is given it by a solution of brass and a decoction of logwood; a green, by a solution of verdigris, and a red by boiling with Brazil wood in limewater. The use of ivory, chiefly for ornamental purposes, was well known in early ages. Among the Greeks it was employed for statuary purposes. The medium weight of an elephant's tusk is sixty pounds, but some are found weighing 170 pounds. Ivory is an important article of African trade, and the number of elephants annually killed to supply the demand has so reduced the herds of these animals that there is danger of their becoming exterminated (See ELEPHANT). Celluloid and vegetable ivory are extensively used as substitutes for ivory.

**Ivory**, VEGETABLE. See IVORY PALM.

**Ivory Coast**, a French colony in West Africa, lying between Liberia on the west and the British Gold Coast Colony on the east, and between the Senegal on the north and the Gulf of Guinea on the south. It has an area of about 116,000 square miles and a population of about 2,000,000, of which the Europeans number less than 300. The seat of government is now Bingerville, formerly called Adjamé. The principal centers of population and commerce are Grand Bassam and Assinie. The climate is extremely hot and unhealthy. Maize, plantains, bananas, pineapples and other fruits, besides coffee, are cultivated with success, and there are considerable exports of mahogany, rubber and cocoanuts. There is a deposit of gold near Grand Bassam. A railway

## Ivory Palm

is under construction from the coast inland, of which about 100 miles had been completed at the close of 1905. There are also telephone and telegraph communication between the principal cities. The French gained possession of the colony about 1843, but for forty years they paid little attention to it. Since 1883 they have undertaken a consistent policy of development.

**Ivory Palm**, a low, palm-like plant, native of the warm parts of South America. It has



IVORY PALM

a creeping trunk, with immense terminal leaves, and bears a cluster of large fruits, weighing, when ripe, about twenty-five pounds. Each fruit contains from six to nine seeds as large as hens' eggs, the kernels of which are close-grained and very hard, resembling ivory in texture and color. These nuts are exported under the name of *vegetable ivory*, and they are extensively used in the manufacture of buttons, knobs for doors, umbrella handles and numerous other small articles.

**I'vy**, a climbing plant that grows wild in Great Britain and on the continent of Europe. The leaves are smooth and shining, varying much in form, from oval entire to three and five-lobed; and their perpetual greenness gives the plant a beautiful appearance. The flowers are greenish and inconspicuous and are suc-

## Izard

ceeded by deep green or almost blackish berries. The common English ivy is very plentiful in Great Britain, growing in hedges and woods and on old buildings, rocks and trunks of trees. Several varieties of ivy are grown in American gardens, among which is the Virginia creeper, sometimes called the American ivy. The poison ivy and ground ivy are not true vines. The ivy attains a great age and its main stems become several inches thick. The wood is soft and porous, and in Switzerland it is much used for making various useful articles. The ivy has been celebrated from remote antiquity and was held sacred in some countries, as Greece and Egypt.

**Ixi'on**, in Greek mythology, king of the Lapithae in Thessaly, who for his wickedness was punished in the lower world by being tied to a perpetually revolving fiery wheel.

**Iz'ard**, GEORGE (1776-1828), an

American soldier, born at Richmond, England, the son of Ralph Izard, a revolutionary patriot in America. He graduated at the College of Pennsylvania in 1792, and later studied in England, Scotland and Germany. He returned to America in 1797, having previously been appointed to a commission in the artillery service in the United States army, and was placed in command of important forts. He resigned from the army in 1803, but reënlisted at the opening of the War of 1812 and attained the grade of major general. He served on the frontier under generals Wade Hampton and Jacob Brown, but gained popular disapproval by his conduct. In 1825 he was appointed governor of Arkansas Territory.



IVY





**J**, the tenth letter in the English alphabet. As a character it was formerly used interchangeably with *i* as either vowel or consonant, and the separation of these two letters in English is of comparatively recent date. Gradually *i* came to represent the vowel sound and *j* the consonant sound. In form also *j* is a modification of *i*. In English *j* has but one sound, a combination of *d* with *zh*, identical with the soft sound of *g*.

**Jab'iru**, a large tropical American stork, sometimes appearing in the Southwestern United States. The feathers are white, but the head and neck are naked and covered with a black skin. The jabiru is the only true American stork.

**Jab'oran'di**, the South American name of several different medicinal plants which have marked power to produce sweating. However, as their poisonous properties are strong, they are not used internally to any great extent and are used only with extreme caution.

**Jacana**, *jak'a na*, the common name of certain wading birds, which have long toes and very long nails, so that they can stand and walk on the leaves of aquatic plants when in search of their food. They live in the marshes of hot climates and are related to the plover. The Indian species, which is called the *surgeon bird*, is brownish above, purplish below, has white head and wings and four very long, dark brown, curved tail-feathers.



JACANA

**Jackal**, *jak'awl*, an animal of the dog genus, resembling a dog and a fox, a native of Asia and Africa. The general color is a dirty yellow. The jackals are gregarious, hunt in packs and



JACKAL

rarely attack the larger quadrupeds. They feed chiefly on carrion and are nocturnal in their habits. Jackals are timid animals and may be easily tamed. The *common jackal* is the most widely distributed. Another species, the *black-backed jackal*, whose fur is highly prized, is found in southern Africa. This species is much more highly colored than any of the others.

**Jack'daw**, a small British crow, with comparatively short bill and whitish eyes. It nests



JACKDAW

in towers, spires and other elevated places, often in the midst of large towns. Jackdaws are very sociable, intelligent birds, and being easily tamed, they make entertaining pets.

## Jack-in-the-pulpit

**Jack-in-the-pulpit** or **Indian Turnip**, a common plant that blossoms in early spring in low grounds or along streams. The flowers come from the flattish, turnip-shaped root, the juice of which is very acrid, or biting. The flowers are very small and are grouped closely together at the base of the rather long, club-



JACK-IN-THE-PULPIT

shaped growth. Around the whole is wrapped a leaf that is greenish on the outside and striped with purple or green within. Later in the season all parts, excepting the stem and the bunch of scarlet berries, wither.

**Jack-o'-lantern.** See **IGNIS FATUUS**.

**Jack' Rab'bit.** See **HARE**.

**Jack'son**, MICH., the county-seat of Jackson co., 76 mi. w. of Detroit, on the Grand River and on the Michigan Central, the Lake Shore & Michigan Southern, the Grand Trunk, the Cincinnati Northern and other railroads. The city is in an agricultural region and is an important railroad center. It has a considerable trade in agricultural produce and implements, and there are large railroad shops and extensive manufactures of carriages, wagons, machinery, flour, clay products and paper. The state prison is located at Jackson. The place was settled in 1829, but it did not grow rapidly until after the construction of the Michigan Central railroad. Population in 1910, 31,433.

**Jackson**, Miss., the capital of the state and the county-seat of Hinds co., 40 mi. e. of Vicks-

## Jackson

burg, near the geographical center of the state, on the Pearl River and on the Illinois Central, the Queen & Crescent and several other railroads. The city has handsome public buildings, of which the most important are the state capitol, the governor's mansion, the Federal building, the state library and the state institutions for the blind, deaf, dumb and insane. Millsaps College, (Methodist Episcopal) and Bellhaven College for young ladies are located here. Good railroad connections and river navigation furnish excellent transportation facilities. A large amount of cotton is raised in this section, and the important industries are the cottonseed oil mills, wood-working establishments and manufactories of fertilizers, agricultural implements and other articles. The place was settled about 1821 and was incorporated in 1840. During the Civil War the city was occupied by the Union forces under General Grant in 1863 and was partly destroyed by General Sherman in 1864. Population in 1910, 21,262.

**Jackson**, OHIO, the county-seat of Jackson co., situated 44 mi. n. e. of Portsmouth, on the Detroit Southern, the Baltimore & Ohio Southwestern and several other railroads. Coal and iron mines of considerable importance are located in the vicinity, and the town has blast furnaces, flour mills, planing mills and woolen mills. Population in 1910, 5468.

**Jackson**, TENN., the county-seat of Madison co., 85 mi. n. e. of Memphis, on the south fork of the Forked Deer River and on the Illinois Central, the Mobile & Ohio and the Nashville, Chattanooga & Saint Louis railroads. It is an important trading center for a rich farming district, and contains cotton mills and manufactures of engines, furniture, clothing, carriages and other articles. The West Tennessee branch of the State Agricultural Experiment Station, Union University, Lane University and the Memphis Conference Female Institute are located here. Jackson was settled in 1810 and was incorporated in 1854. During the Civil War it was used as a basis of operations. Population in 1910, 15,779.

**Jackson**, ANDREW (1767-1845), an American statesman, seventh president of the United States, born in North Carolina. His father, a Scotchman, died before the birth of his child, leaving him to the care of a poor but indulgent mother. In his fourteenth year, near the close of the American Revolution, Andrew joined the regiment of volunteers to fight in the cause of independence. He lost two brothers in the



## Jackson

struggle and finally retired from military service, devoting himself intermittently to the study of law. He was not a great lawyer, but as public prosecutor in the district now known as Tennessee, he gained many friends by his honest and resolute policy. He became a judge of the district supreme court, representative in Congress and United States senator, but resigned the last office after only a few months.

When in 1812 war was declared against England, Jackson offered his services at the head of 2500 Tennessee militiamen and was made major general of volunteers. He went to the front, but after a few months was dismissed without pay for himself or his men and



ANDREW JACKSON

returned to Tennessee. In 1813 he was again commissioned, and he defeated the Creek Indians, who had long been wasting the country with fire and sword. He was then made major general in the regular army and soon after attacked and captured Pensacola, without orders. In January, 1815, he established his military reputation by the repulse of an elaborate British attack upon New Orleans. His arbitrary proceedings, however, aroused disapproval, and he was condemned to pay a heavy fine, which, however, was remitted thirty years later by Congress. In 1817 he again proceeded against the Seminole Indians, but again incurred popular disapproval by excessive severity and disregard

## Jackson

of international usage in the execution of two British subjects in Florida.

In 1821 he was appointed governor of the newly acquired Territory of Florida, and two years later he was elected to the United States Senate from Tennessee, at the same time being nominated for president by the state legislature. The contest for the presidency was exceedingly bitter, and four candidates received electoral votes, Jackson, John Quincy Adams, William H. Crawford and Henry Clay, in the order named. No one had a majority, however, and the House of Representatives elected Adams. Four years later, in one of the most bitter contests in American history, Jackson was elected, and he was reelected in 1832 over the Whig candidate, Henry Clay.

The election of Jackson to the presidency marks an important epoch in American political history, as he was the first real representative of the so-called "common people." During his administration the spirit of democracy was given a tremendous impulse throughout the country. The first important event during his term was his removal of public officers upon the ground of their political affiliations, in accordance with the doctrine enunciated by his friend Marcy, that "to the victors belong the spoils of the vanquished" (See CIVIL SERVICE AND CIVIL SERVICE REFORM). He also vetoed the United States Bank charter and thus precipitated a long contest; and he crushed the nullification movement in South Carolina by a prompt and vigorous display of Federal authority. During the contest over the national bank, which extended throughout his second administration, a resolution of censure was passed upon President Jackson, which was not repealed until 1837. It was during Jackson's administration also that the question of slavery first became a prominent factor in politics.

Upon retiring from office, he returned to his home near Nashville, which he called the "Hermitage." Jackson was one of the most forceful personalities in American history. Though not a deep thinker, when action was called for he administered affairs with vigor and discretion. Consult Sumner's *Andrew Jackson*, in American Statesmen Series; also Parton's *Life of Andrew Jackson*.

**Jackson, HELEN FISKE HUNT** (1831-1885), an American novelist and poet. She was born at Amherst, Mass., was educated in Ipswich and New York and at twenty-one married Major Edward B. Hunt. Her first poems, written at







THOMAS J. (STONEWALL) JACKSON

## Jackson

Newport, R. I., after her husband's death in 1863, and signed "H. H.," were encouragingly received. She remarried in 1875. Later poems, humorous sketches of travel, two novels and various stories for children are included in her works, but she is best known for her impassioned appeal for the indian in *A Century of Dishonor*, and *Ramona*. To finish this great story, in which she was to voice the indian's wrongs, she fought heroically against the disease which in the next year caused her death.

**Jackson, THOMAS JONATHAN** (1824-1863), more commonly known as "Stonewall" Jackson, an American soldier, born at Clarksburg, Va. (now W. Va.), of Scotch-Irish parentage. He early showed marked qualities of leadership, was elected sheriff at the age of eighteen and at about the same time entered West Point, where he graduated in 1846 with honors, in a class which included McClellan, Pickett and A. P. Hill. He entered the army immediately, served in the Mexican War and was brevetted captain and major for gallantry in action. He resigned from the army in 1851, became professor of military tactics in Lexington Military Institute. Here he remained until April, 1861, never attaining distinction as an instructor, for he did not inspire interest in his subjects, and his eccentricities of manner were such that the cadets were continually laughing at him. He was, however, a powerful influence for good in the community as an ardent Presbyterian and gave much of his time and money even while in active service to the betterment of the negroes who belonged to his class in Sabbath School. It is interesting to know that after the war, when a bronze monument was to be raised to his memory in Lexington, the first contribution came from the colored Baptist Church. Jackson was a union man and did not favor secession, but when volunteers were called for to coerce the States he said, "I have longed to preserve the Union and would have been willing to sacrifice much to that end. But now that the North has chosen to inaugurate war against us, I am in favor of meeting her by drawing the sword and throwing away the scabbard." He was commissioned colonel in the Virginia forces and later placed in command of the Virginia brigade which afterwards became so famous under him. At the battle of Bull Run, when Jackson was seen fighting valiantly against what seemed to be overwhelming odds, General Bee called out, "There stands Jackson like a stone wall." The phrase was taken up and from that time on

## Jacksonville

Jackson was known as *Stonewall* and his troops as the *Stonewall brigade*. He was promoted to be major general in September of the same year, and in a campaign in the Shenandoah Valley against General Banks, he won brilliant victories at McDowell and Winchester and completely baffled the Federal commanders.

In June, 1862, Jackson joined Lee in the defense of Richmond against McClellan and took a prominent part at the battles of Mechanicsville and Malvern Hill, and, after McClellan's withdrawal, at Cedar Mountain and the second Battle of Bull Run, against General Pope. His force was conspicuous in Lee's first invasion of the North, and at Antietam and Fredericksburg he did yeoman's service for the Confederate army. In May, 1863, at Chancellorsville, he fell upon Hooker's right flank under Howard and almost destroyed a full corps. At nine o'clock in the same night he was accidentally shot by his own men, while reconnoitering, and died May 10. His loss was a severe blow to the Confederate cause, for he had been a tower of strength in every campaign. He combined a deeply religious nature with the highest military talents, beginning every battle with prayer and giving thanks to God after every victory. He was without doubt the greatest lieutenant upon either side in the Civil War, but was never tried in command of large forces. Consult Hovey's *Stonewall Jackson*.

**Jack'sonville, FLA.**, the county-seat of Duval co., situated 165 mi. e. of Tallahassee, on the w. bank of the Saint Johns River, on the Southern, the Atlantic Coast Line, the Florida East Coast and other railroads. The ocean beaches near here are among the finest on the Atlantic coast, and the city has long been a popular winter resort. There are many fine churches, among which the Snyder Memorial, Saint John's Episcopal and the Church of the Good Shepherd are especially noteworthy. There are also several charitable institutions. Other prominent structures are the Federal building, the armory, Duval High School, the board of trade, the Masonic temple and several club houses and hotels.

The city is an important trading port and ships large quantities of lumber, shingles, cross-ties, naval stores, turpentine and garden produce. The principal manufacturing establishments are lumber mills, ice plants, foundries, brick and tile works, shipyards and various factories. The place was settled in 1822 and was named in honor of Andrew Jackson, the



## Jacksonville

first territorial governor of Florida. It was incorporated in 1833. In 1901 a fire destroyed a great number of buildings, causing a loss of about \$12,000,000, from which the city has completely recovered. Population in 1910, 57,699.

**Jacksonville, ILL.**, the county-seat of Morgan co., 34 mi. w. of Springfield, on the Chicago, Burlington & Quincy, the Wabash and other railroads. The Illinois College, which was founded here in 1829, is the oldest institution of higher education in the state. It has absorbed Jacksonville Female Academy and also includes the Whipple Academy and a conservatory of music. The city is the seat of the Illinois Woman's College and of state institutions for the insane, the blind and the deaf and dumb; also of a Carnegie public library, two hospitals, a park and county fair grounds. Other prominent buildings are the city hall, the courthouse and the high school. The industries include railroad shops and wool, flour and paper mills, and there are also considerable exports of live stock. The place was settled as the county-seat about 1825 and was incorporated as a city in 1867. Population in 1910, 15,326.

**Jack's stones**, a game common among children, played with small pebbles or with iron pieces made specially for the purpose. The game consists in tossing or catching one or more of the stones in various ways, after having touched, moved or caught up the other stones which lie on the ground. Many different forms of the game exist, and the different steps are known by fanciful names.

**Jack's straws**, a game played with many little sticks of wood, from four to six inches long and of generally uniform size, carved in the shape of implements and tools. The sticks are thrown together in a heap, and each player, in turn, extracts with a tiny hook as many of the straws as possible (one at a time), without causing any others to move. The player having the greatest number of straws when all have been removed from the table is declared the winner.

**Ja'cob**, the son of Isaac, the grandson of Abraham, the last of the Jewish patriarchs and the true ancestor of the Jews. Having craftily obtained from the blind and infirm Isaac the blessing of the firstborn in place of his brother Esau, he was obliged to flee from the anger of his brother and took up his abode with his uncle Laban. Here he served twenty years and obtained Leah and Rachel as his wives. On

## Jacob Tome Institute

his return to Canaan he was met by an angel, with whom he wrestled all night, and having gained the victory was thereafter named *Israel*, that is, *the hero of God*. Hence the Hebrews, from him, are called Israelites. Jacob died, aged 147 years, about 1860 B. C., and according to his wish was buried in the tomb of Abraham, before Mamre in Canaan.

**Jac'obins**, the most famous of the clubs of the French Revolution. When the States-General assembled at Versailles in 1789, a club was formed by a number of deputies from Brittany, called the *Club Bréton*. On the removal of the court and national assembly to Paris it acquired importance and rapidly increased. It adopted the name of *Société des Amis de la Constitution*, but as it met in a hall of the former Jacobin convent in Paris, it was called the Jacobin Club. It gradually became the controlling power of the Revolution, and its influence spread over France, hundreds of branch societies being established. The Jacobins were foremost in the insurrectionary movements of June 20 and August 10, 1792, and they originated the formidable Commune of Paris. For a while they ruled supreme, and the Convention itself was but their tool. Robespierre was their most influential member; they ruled through him during the Reign of Terror and were overthrown after his downfall in 1794. The term *Jacobin* is now often used to designate any one holding extreme views in politics.

**Jac'obites**, Christians in the East, who were united by a Syrian monk, Jacobus Barbadaeus (578), during the reign of Justinian, into a distinct religious sect. The Jacobites, so styled from their founder, number now about 80,000. They are governed by the patriarch of Antioch, whose appointment must be confirmed by the sultan, and who has under him eight metropolitans and three bishops. The metropolitan of Jerusalem ranks higher than the others, and with the patriarch he lives at the monastery near Mardin. The doctrine of the single nature of Christ is common to them and to the Copts and Abyssinians; but in other respects they differ little from the orthodox Greek Church.

**Jacob Tome Institute**, a school for secondary education, established at Port Deposit, Maryland, in 1894, by Jacob Tome. It has a kindergarten department, a junior department for boys and girls, a high school for girls and a boarding school for boys. There are about 50 teachers and 600 students. The institute has an endowment of over \$2,000,000.

**Jacotot**, *zhah ko to'*, JEAN JOSEPH (1770-1840), a French educator, born at Dijon. While serving as lecturer on the French language at Louvain, he was compelled to give lectures in French to students who were wholly unacquainted with the language, and the difficulties which he experienced led him to work out a system of teaching, peculiarly his own. The central idea of his method rests upon the correlation of all knowledge. He believed that a single fact learned thoroughly, first by observation and afterwards by contemplation, becomes the spur and possibly the key to the acquisition of other facts. According to Jacotot's idea, by starting with a single truth one is able to extend his knowledge to nearly all subjects. His method was very successful and has been in use in Europe and America, where it has exerted great influence toward the correlation of subjects.

**Jacquard**, *zha kahr'*, JOSEPH MARIE (1752-1834), a French inventor, born in Lyons. He was the inventor of the famous machine for figured weaving, which is named after him. His parents were silk weavers, and he learned the same trade. After a long period of hardship Jacquard made his name famous by the invention of his new loom, which was publicly exhibited in 1801. He endeavored to introduce it into general use in Lyons, but was mobbed, and almost lost his life. Ultimately, however, his invention was bought by the French government, and he was able to spend the latter part of his life in comfortable independence. See WEAVING.

**Jacquard Loom.** See WEAVING.

**Jacquerie**, *zha kre'*, INSURRECTION OF THE, the name given to the rising of the French peasantry against their lords in the middle of the fourteenth century, after the Battle of Poitiers. They committed every atrocity, particularly in the northcast of France. They were at length quelled and the nobles retaliated by enormities as great as those which the peasants had practiced earlier. The term *Jacquerie* is derived from *Jacques Bonhomme*, a familiar epithet for a peasant.

**Jade**, a variety of hornblende, containing calcium, magnesium and silica. It is also called *nephrite*. It is usually of a color more or less green, of a resinous or oily aspect when polished, hard and very tenacious. It has been used by rude nations for their weapons and implements and has been and is highly prized for making carved ornaments in China, New

Zealand and among the native races of Mexico and Peru. Jade axes are common among uncivilized races, and prehistoric specimens have been found in Europe, though the stone itself is not found there. A similar stone, more properly called *jadeite*, is frequently confounded with jade proper. It is a silicate of aluminum and sodium.

**Jaffa**, *yahj'jah*, or **Yafa**, a city of Palestine, situated on the Mediterranean, 31 mi. n. w. of Jerusalem, with which it is connected by railway. The site of the city slopes toward the sea. The town contains a number of buildings of considerable note because of their architecture. Among them are mosques and churches, also several hospitals and hotels. The commerce is of considerable importance, the exports consisting of fruits, wool, wine, sesame and a few manufactures. Being the nearest port to Jerusalem, its tourist trade is large. Ancient Joppa was the seaport of Jerusalem in early days, and it is probable that through this port came most of the wealth that Solomon received from his seafaring expeditions. Population, estimated at 40,000.

**Jagannatha**, *jug'a nah't'a*. See JUGGERNAUT.

**Jaguar**, *ja gwahr'*, a member of the cat family, found in South and Central America. It is not quite as large as a tiger and is of a yellowish or fawn color, marked with large dark spots and rings, the latter with a dark spot in the center of each. Some species are nearly black. The jaguar rarely attacks man unless hard pressed by hunger or driven to bay. The favorite haunts are the forest swamps of the Amazon. The skin is valuable, and the animal is hunted by the South Americans in various ways. (See illustration on next page.)

**Jahn**, *yahn*, FRIEDRICH LUDWIG (1778-1852), the founder of the German *turnverein*, noted for his introduction of physical training into Germany. He was born at Lanz and educated at the universities of Halle and Greifswald. At first his work met with great opposition, but he finally secured the approval of the emperor and one of his ministers. He was active in the war of 1813, after which he devoted his time to the development of physical culture throughout the country. In 1848 he was made a member of the national assembly and was one of the leaders in securing a united Germany. The *turnvereins* established through his influence still exist.

**Jail Fever**, a dangerous disease once very prevalent in prisons. See TYPHUS FEVER.



## Jainas

**Jainas**, *jī'nas*, or **Jains**, a Hindu religious sect, which, from the wealth and influence of its members, forms an important division of the population of India. The sect was very numerous and important in the eighth and ninth centuries of the Christian era and they have left many monuments of their skill and power in the fine temples built in different parts of the country. Jainism was an offshoot of Buddhism, with which it has many leading doc-

## Jalapa

palace, the Sanskrit College, the meteorological observatory and the Mayo Hospital. The city also contains a number of public gardens, noted for their beauty. The leading industries are the manufacture of jewelry and textiles. Jaipur is an important commercial center. Population in 1911, 137,098.

**Jalandhar**, *jul'an dur*, or **Jullundur**, a town of India, capital of a district of the same name, in the Punjab, 75 mi. e. of Lahore. It



JAGUAR

trines in common, but from which it is distinguished by its recognition of a divine personal ruler of all and by its political leanings toward Brahmanism. The Jains reverence certain holy mortals, who have acquired by self-denial and mortification a station superior to that of the gods; and they manifest extreme tenderness for animal life.

**Jaipur**, *jī poor'*, or **Jeypore**, a city of India, the capital of the native state of Jaipur, situated 148 mi. s. w. of Delhi. It is a modern city in every respect and is considered one of the best-built cities in India. It has municipal waterworks and is illuminated by gas. Among the public buildings of importance are the

is in a rich agricultural region, and it has a large cantonment. Population, 67,735.

**Jal'ap**, a twining plant of the *Convolvulus* order, with heart-shaped leaves and elegant deep pink flowers. It grows native on the eastern side of the Mexican Andes, at an elevation of from 5000 to 8000 feet. The jalap of commerce consists of the irregular, dark brown roots, varying from the size of a hazelnut to that of an egg. The drug has little smell or taste and is one of the most common cathartics, though objected to because of its tendency to give pain. (See illustration on next page.)

**Jalapa** or **Halapa**, *ha lah'pa*, a city of Mexico, in the Department of Jalapa, 52 mi.



## Jamaica

n. w. of Vera Cruz. The climate is fine, and the city is a favorite health resort. The city has a fine cathedral, a Franciscan convent and several schools. The jalap root is found abundantly in Jalapa. Population in 1910, 24,816.

**Jamaica**, one of the Great Antilles, the largest of the British West India Islands, 90 mi. s. of Cuba and 100 mi. w. of Haiti. It is 140 miles long and 50 miles wide and has an area of 4200 square miles. In the western coast are the lowlands, and the central part is mountainous, some of the peaks reaching 7000

feet. The Blue Mountains, in the eastern end, are the most important chain and have the loftiest heights. The coast line is indented by a great number of excellent harbors, Port Royal, or the harbor of Kingston, and the Old Harbor being the most important. There are many rivers in Jamaica, most of them unnavigable but employed in the irrigation of the land. Among the most important of these are the Plantain, the Garden, the Black, the Salt and the Caba-rita. The vegetable and animal life correspond in general to the vegetable and animal life of the West Indies (See WEST INDIES). The chief industry is agriculture. Indigo, cotton



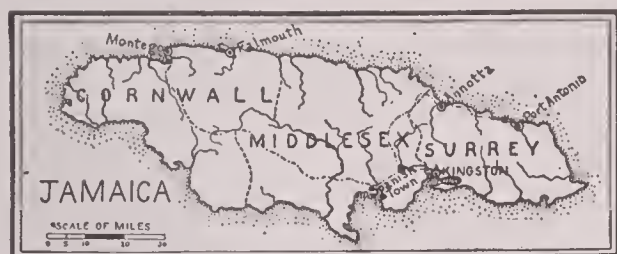
JALAP

## James

The government of Jamaica is administered by a governor. He is aided by a privy council, appointed by the Crown, and a legislative council, consisting of fifteen members nominated by the governor and fifteen elected by limited suffrage. The island is divided into three counties and is subdivided into fifteen parishes. Jamaica was discovered by Columbus in 1494, and in 1509 the Spaniards settled there. The native population rapidly decreased during the Spanish régime, and by the middle of the seventeenth century it was almost extinct. In 1655 the island was captured by a British expedition, and in 1670, by the Treaty of Madrid, Great Britain gained possession of the island. In the eighteenth century many negroes were brought to the island for sugar-plantation labor. These negroes rose in revolts and were a great drawback to the prosperity of the settlements. They were not completely subdued until 1796. In 1831 another negro insurrection occurred, and two years later an emancipation act was passed, providing for the total extinction of slavery after 1838. The chief towns are Kingston (See KINGSTON), Port Royal, Morant and the important villages of Lucea, Montego Bay, Falmouth and Port Antonio. Population in 1911, 831,383.

**Jamaica**, N. Y., the county-seat of Queens co., 12 mi. e. of Brooklyn, on Long Island. It was included in the Borough of Queens of Greater New York in 1898.

**James I**, of England, also JAMES VI of Scotland (1566-1625), was the only son of Mary Stuart by her second husband, Lord Darnley. In 1567, on his mother's abdication, he was crowned at Stirling. He had much trouble with his nobles, a party of whom made him captive at Ruthven Castle in 1582; but a counter party soon set him at liberty. In 1589 he married Princess Anne of Denmark. In 1603 he succeeded to the crown of England, on the death of Elizabeth, and was received with great enthusiasm. One of the early events of his reign was the Gunpowder Plot, the outgrowth of the constant persecutions of the Catholics which James permitted. An unsuccessful attempt was made to unite Scotland and England, and by a decree all Scotchmen born after the accession of James to the English throne were declared English subjects. In 1613, Elizabeth, the daughter of James, was married to the elector palatine, and at the outbreak of the Thirty Years' War it was expected that James would send aid to his son-in-law, who had been made king of Bohemia.



and cacao were formerly important products, but now these are supplanted by sugar, coffee, bananas, spices and oranges. Tobacco, yams, arrowroot and ginger are also extensively grown, and rum is made. The forests produce many fine trees, including the ebony, logwood, mahogany and lancewood. The chief exports are fruit, sugar, rum, coffee and pimento, and the imports include textiles, fish and flour.



This James seemed unwilling to do, and the little assistance which popular feeling at length compelled him to render, was too late to do any good. He wished to marry his son Charles to a Spanish princess, but this project failed, and war was declared against Spain. The king, however, died soon after. In his reign the authorized translation of the Bible was executed.

**James II** (1633–1701), king of England, second son of Charles I and of Henrietta Maria of France. In spite of attempts which had been made to exclude him from the throne, because he had adopted the Catholic religion, he succeeded his brother Charles II as king in 1685 and at once set himself to attain absolute power. A rebellion headed by the duke of Monmouth was easily put down, but the result was to confirm the king in his arbitrary measures. He even accepted a pension from Louis XIV, that he might more readily effect his purposes, especially that of restoring the Roman Catholic religion. The result of this course of action was the revolution of 1688, and the arrival of William, prince of Orange. Soon James found himself completely deserted; he quitted the country and repaired to France, where he was received with great kindness and hospitality by Louis XIV. Assisted by Louis, he attempted in 1689 the recovery of Ireland; but the Battle of the Boyne, fought in 1690, compelled him to return to France. All succeeding projects for his restoration proved equally ineffectual, and he spent the last years of his life in retirement.

**James, EDMUND JANES** (1855– ), an American educator and political economist, born at Jacksonville, Ill. He was educated at Northwestern University, at Harvard and in Germany. In 1883 he became professor of public finance and administration in the University of Pennsylvania. While occupying this position he was chosen by the American Bankers' Association to make a study of European business methods, and his report is considered a standard authority. In 1896 he became director of the extension division of the University of Chicago. Six years later he was chosen president of Northwestern University, and in 1904 he became president of the University of Illinois. He is the author of *The Canal and the Railway*, *The Federal Constitution of Germany*, *Education of Business Men in Europe*, *The Growth of Great Cities in Area and Population* and numerous other works of an economic or sociological nature.

**James, HENRY** (1843–1916), an American novelist. He lived much on the Continent and in England, and shortly before his death became a British citizen. His numerous novels depend for their interest on the portrayal of character, rather than on incident, and the later of them, especially, are characterized by the most subtle psychological analysis. Among his works are *Daisy Miller*, *A Passionate Pilgrim*, *Roderick Hudson*, *The Portrait of a Lady*, *The Bostonians*, *The Princess Casamassima*, *The Sacred Fount*, *The Awkward Age*, *The Soft Side* and *The Better Sort*.

**James, JESSE W.** (1847–1882), an American outlaw and bandit, born in Clay County, Mo., the son of a Baptist preacher. During the Civil War the family was persecuted on account of its sympathy for the Southern cause, and the several sons joined a band of guerrillas, which kept up a lawless warfare until the end of the struggle. Jesse James surrendered at the close of the war, but in 1866 he was declared an outlaw and for the remainder of his life was constantly pursued by officers of the law. During this period he attained wide notoriety by his many bold crimes and his great ingenuity in eluding capture. He was particularly famous for his train robberies in western states. The governor of Missouri finally offered a reward of \$10,000 for his capture, dead or alive, and two members of his own party killed him in his own home. His brother Frank was also a notorious criminal and was implicated in many of his brother's escapades.

**James, SAINT**, called *the Greater*, the son of Zebedee and the brother of John the evangelist. Christ gave the brothers the name of Boanerges, or *sons of thunder*. According to the Gospels, they witnessed the transfiguration, the restoration to life of Jairus's daughter, the agony in the garden of Gethsemane and the ascension. Saint James was the first of the apostles who suffered martyrdom, being slain by Herod Agrippa about 42 A. D. There is a tradition that he went to Spain, of which country he is the tutelary saint.

**James, SAINT**, called *the Less*, the brother or cousin of our Lord, who appeared to James in particular after his resurrection. He is called in Scripture *the Just*, and is probably the apostle described as the son of Alphaeus. He was first bishop of Jerusalem, and in the first apostolic council he spoke against those wishing to make the law of Moses binding upon Christians. The progress of Christianity under him alarmed the

**Jews**, and he was put to death by Ananias, the high priest, about 62 A. D. He is the supposed author of the epistle which bears his name, a book written in very pure Greek and having a high rhetorical character.

**James, WILLIAM** (1842-1910), an American psychologist, born in New York and educated at Harvard and in German universities. In 1872 he became professor of anatomy at Harvard, then of philosophy and finally of psychology. Professor James gained a wide reputation by his writings and lectures and was one of the chief American exponents of the new psychology, or psychology from a physiological standpoint. Among his works may be mentioned his *Principles of Psychology*, *Talks with Teachers on Psychology* and *The Will to Believe*.

**James Bay**, the southern extension of Hudson Bay. It was named from Captain James, who explored it while trying to find the northwest passage. It has numerous rocks and islands, and its navigation is dangerous. The chief affluents are the Albany and East Main rivers.

**Ja'meson, LEANDER STARR** (1853- ), a Scotch physician and soldier. He received his medical education at London University, and in 1878 he went to South Africa, where he acquired a lucrative medical practice. In 1888 he became associated with Cecil Rhodes and in 1891 was made administrator of Rhodesia. In 1895 he was the leader of the famous "Jameson's Raid," a result of the Uitlander agitation in Johannesburg. His advance was checked, and his band surrendered. He was taken to England, tried, convicted of misdemeanor and sentenced to ten months' imprisonment. In 1900 he became a member of the Cape Legislative Assembly for Kimberley, and from 1904 to 1908 he was premier of Cape Colony. He was made a baronet in 1911. See SOUTH AFRICAN WAR.

**James River.** See DAKOTA RIVER.

**James River**, a river in Virginia, formed by the union of the Jackson and Cowpasture rivers, which rise in the Alleghany Mountains. It flows east-southeast, passing the towns of Lynchburg and Richmond, and communicates by means of a broad estuary, through Hampton Roads and the mouth of the Chesapeake Bay, with the Atlantic. Its length is 450 miles, and it is navigable from the ocean to Richmond. The principal tributaries are the Appomattox and the Chickahominy. The first English settlement in America was formed at Jamestown, 32 miles from the mouth of this river, in 1607.

**James'town**, the first permanent English

settlement in America, founded by an expedition sent out under the auspices of the London Company and under the immediate command of Christopher Newport and John Smith. The site chosen was about fifty miles from the mouth of the James River, on a low peninsula, and the landing took place May 13, 1607. For later history of this colony, see VIRGINIA, subhead *History*.

In 1907 there was held at Hampton Roads, five miles from Norfolk, an exposition to commemorate the three-hundredth anniversary of the settlement at Jamestown. The buildings were beautiful and the exhibits interesting, but bad weather, combined with the facts that the buildings and grounds were not all in readiness at opening time, and that hotel accommodations were inadequate, resulted in a comparatively small attendance.

**Jamestown, N. D.**, the county-seat of Stutsman Co., 80 mi. w. of Fargo, on the James River and on the Northern Pacific railroad. The city is in the famous artesian belt and is surrounded by a farming and stock-raising region. It is an attractive place, is beautifully built and has large business interests, including grain elevators, flour mills, stockyards and other industrial establishments. Population in 1910, 4358.

**Jamestown, N. Y.**, a city in Chautauqua co., 69 mi. s. of Buffalo, at the outlet of Lake Chautauqua and on the Erie and the Jamestown, Chautauqua & Lake Erie railroads. It is in a rich agricultural region and has become a popular summer resort. A popular attraction is Celeron, which is an amusement resort on the lake shore, similar to Coney Island. The extensive manufactures include furniture, metallic goods, voting machines and other articles, while in the production of worsted goods it is one of the leading cities in the state. Jamestown has a good high school and the Prendergast Free Library. The place was settled in 1810 and was incorporated as a city in 1896. Population in 1910, 31,297.

**Janesville, jaynz'vill**, Wis., the county-seat of Rock co., 71 mi. s. w. of Milwaukee, on the Rock River and on the Chicago & Northwestern and the Chicago, Milwaukee & Saint Paul railroads. The city is in an agricultural region noted for its fine tobacco, and it has a large trade in farm and dairy produce. There are also stockyards and large lumber and brick yards. The manufactures include cotton and woolen goods, agricultural implements, furniture and other articles. It is the seat of the state school for the blind.



The place was settled in 1837 and was incorporated in 1853. Population in 1910, 13,894.

**Jane'way**, EDWARD GAMALIEL (1841-1911), an American physician born near New Brunswick, N. J. He graduated at Rutgers College and from the College of Physicians and Surgeons of New York City. He soon settled at New York, where he labored with eminent success in his practice and as professor in various schools. Since 1898 he has been dean of the University-Bellevue Medical College.

**Jan'izaries**, an Ottoman infantry force, somewhat analogous to the Roman praetorians, part of them forming the guard of the sultan. They were originally organized about 1330, and subsequently they obtained special privileges, which in time became dangerously great. They became so influential and their insurrections so frequent that several unsuccessful attempts were made to reform or disband them. At last, in June, 1826, they rebelled, but the sultan, Mahmud II, defeated them and burned their barracks; 8000 of them perished in the flames. The corps was abolished, and a curse was laid upon the name. As many as 15,000 were executed, and fully 20,000 were banished.

**Jan'uary**, the first month of the year, consisting of 31 days. It was by the Romans held sacred to Janus, from whom the name was derived. The Roman year originally began with March and consisted of only ten months.

**Ja'nus**, an ancient Latin divinity, the porter of the gods, after whom the first month of the year was named. He was held in great reverence by the Romans, and as the guardian of doors and gates he was usually represented with two faces, one looking forward, the other backward. In time of war the gates of the chief temple of Janus at Rome were always left open, and in peace they were closed. The principal festival of Janus was New Year's Day.

**Japan'**, an island empire, situated east of Asia, from which it is separated by the Sea of Japan and Korea Strait, and bounded on the e. by the Pacific Ocean. Japan proper, or Old Japan, consists of four large islands, Yezo, Hondo, Shikoku and Kiushiu, together with a large number of smaller islands. The present empire contains, in

addition to these, Formosa, the Loo-Choo Islands to the south, the Kurile Islands to the north and the southern half of Sakhalin, acquired from Russia by the war in 1905. Including these additions the Empire extends from latitude 21° 48' to 51° 56' north, and from longitude 119° 20' to 156° 32' east. The greatest extent from north to south is nearly 2400 mi. The greatest width of any of the islands is about 250 mi., and the average width much less than this. The area of the Empire is about 190,000 sq. mi., or about the same as the combined areas of Colorado and Idaho. The area and population of the principal islands in 1908 was as follows:

ISLAND	AREA IN SQUARE MILES.	POPULATION.
Hondo.....	87,485	37,414,281
Shikoku.....	7,030	3,288,310
Kiushiu .....	16,840	7,726,934
Yezo .....	36,299	1,137,445
Formosa (1911).....	13,418	3,392,063
TOTAL .....		52,959,033

**SURFACE AND DRAINAGE.** The first four islands named above form approximately a crescent and are separated from each other only by narrow straits. Their surface is mountainous, and the trend of the main range of mountains is in the same direction as the greatest extent of the islands. Hondo, about 700 miles in length, is characterized by a continuous mountain range, extending from the southwest to the northeast. In this, as well as in the other islands, this range is crossed at intervals by short ranges, extending north and south, and where these ranges meet the mountains are the most numerous and reach their highest altitudes. The islands are of volcanic origin, and among the mountains are many extinct volcanoes, as well as some that are still active. Fujiyama, 60 miles southwest of Tokyo, with an altitude of 12,390 feet, is the highest peak in these islands; it is famous for the symmetry of its cone and the distance from which it can be seen at sea. In Formosa, Mount Morrison rises to the height of 13,595 feet. The mountain ranges and many peaks are separated by deep valleys with steep slopes, through many of which flow rapid streams. The level land is along the lower courses of the streams and near the coast. This and most of the mountains are covered with forests and tall grass, except where the land is suitable for tillage.

In general, the rivers are short and rapid and are navigable for only a short distance. The longest stream is the Ishikari, in Yezo, which



HEAD OF JANUS  
From a Roman coin

has a length of 407 miles. The Shinano Gawa in Hondo is the second stream in importance, with a length of 320 miles. The others seldom exceed 100 miles, and some fall far short of this. While not useful for commercial purposes, most of these streams are of value as furnishing means for irrigation. There are but few lakes in the Empire. The most important of these is Lake Biwa, in the south central part of Hondo.

**CLIMATE.** On account of its great extent north and south, the climate of Japan varies from sub-tropical, in the vicinity of Formosa, to sub-arctic, in Sakhalin and the Kurile Islands. The central part of the Empire has an equable and moderate temperate climate, due very largely to the influence of the warm current in the Pacific Ocean (See KURO SIVO). In the northern islands the winters are severe and the snowfall is heavy. In Hondo, Shikoku and Kiushiu, more or less snow falls throughout the winter, but in the southern half of Hondo it remains only a short time. The rainfall depends largely upon the winds; hence the necessity for irrigation during certain seasons of the year, when otherwise the annual precipitation would be enough for agriculture. The climate is healthful, although the summers are hot.

**MINERAL RESOURCES.** The mineral resources of the Empire include coal, which is found in paying quantities in Yezo and Kiushiu and in smaller quantities in various places. The mines in Kiushiu are quite extensively worked, and the output is now about 7,000,000 tons a year. Iron ore is also found in paying quantities, as is copper. Lead, gold, silver and some other minerals are found in various parts of the Empire, but none of these has been worked to a great extent. Petroleum is obtained in small quantities, and marble, granite and other building stones are generally distributed throughout the islands.

**FISHERIES.** The streams as well as the coast waters abound in fish, and the taking and curing of these gives employment to a large number of people. Many varieties of fish are caught, the most important including mackerel, sturgeon, haddock, halibut and salmon, in the north, and perch, pike and trout, in the streams. Fish culture is given careful attention by the government, and numerous hatcheries are maintained.

**AGRICULTURE.** Only a little over one-tenth of the country is suitable for tillage, and farming is on the intensive plan. Naturally much of the soil is unfertile, but by means of fertilization known to the Japanese, careful irrigation and thorough tillage this is made to produce abun-

dant crops. Rice is the most important food crop and is grown wherever the land can be sufficiently irrigated. Following this in the order of importance among the cereals are barley, rye, wheat, corn, buckwheat and millet. Potatoes and all sorts of vegetables are also grown. Tea is raised in the central part of the Empire, and fruits common to the temperate regions are grown to some extent, though they do not seem to thrive as well as upon the continent of Asia. The mandarin orange (See ORANGE) and persimmon are exceptions to this rule. Cherry and plum trees are cultivated for their blossoms. Considerable sugar cane is raised in the southern portion of the Empire. The growing of live stock has not received very much attention, and until a comparatively recent date butter, cheese and milk were unknown to the people, but now they are found in the central and northern portions of the island. Silk is produced in those regions adapted to the growing of the mulberry tree.

**MANUFACTURES.** The manufacturing industries of Japan may be classed as original and introduced. The original are those which have existed from ancient times. The chief of these industries are pottery making, weaving, embroidering, lacquer work, paper industry, metallic industry, leather work, wood and bamboo work, carving, camphor producing, vegetable wax making, salt making, sugar making, saki brewing, soy brewing, oil producing and tobacco manufactures. It is probable that these industries were introduced from China and Korea, but the original trace has been obliterated. The scope of the work is generally small and is done with rude and simple instruments, especially in the fine arts. The artisans use their residences for workshops and employ only a small number of apprentices. The process of manufacturing is very tedious, but the taste and magnificence of purely Japanese arts are admired throughout the world.

The principal introduced industries, that is, those brought from America and Europe, include spinning, glass work, brick making, preparation of drugs and chemicals, cement works, ship-building, machinery, match, paper and soap manufacture. These industries are generally carried on in a large factory employing many workmen and utilizing water and steam power, thus forming a decided contrast to the native industries. The latest returns show the number of factories and workshops belonging to companies and individual persons to be many thousands, with millions of capital. The silk



producing factories are of first importance; cloth weaving, mining and refining of minerals are next. Other important works are for the manufacture of tobacco, porcelain, earthenware, matches and bricks. There are numerous government workshops under control of various departments, such as the imperial mint, the printing bureau, the Tokyo arsenal, the Osaka arsenal, the woolen-cloth factory; in connection with the war department, several dock yards, naval arsenals and gunpowder factories, all of which are engaged in the manufacture of goods required by the government.

**TRANSPORTATION.** The first line of railway in Japan was constructed from Tokyo to Yokohama in 1872, and from that time to the present both the government and private corporations have been engaged in extending railway lines, so that now all of the principal cities on the large islands have railway connection with each other. The Empire contains about 5000 miles of railways, nearly 2000 miles of which belong to the government. The extensive coast line and numerous good harbors give Japan unusual facilities for communication by sea, and she maintains a large merchant marine, consisting of over 1300 steamships and about 4000 sailing vessels. Japanese lines of steamers ply regularly between the leading ports of the Empire and the Pacific ports of the United States, also between Japan and India and Europe. In addition to these, the lines of other commercial nations make regular trips to the leading Japanese ports. Through the American and British Pacific cables there is also telegraph communication with the entire civilized world; telephone and telegraph lines are in common use throughout the Empire. An excellent postal system, patterned after that of the United States, is maintained. Roads such as are known in the United States and Europe are few. The most common vehicle for the transportation of passengers is the jinrikisha (See JINRIKISHA). It is believed that this vehicle is patterned after an American sulky, which it quite closely resembles. All in all, the facilities of Japan for transportation and communication compare favorably with those in the United States and the leading European countries.

**COMMERCE.** The commerce is extensive and is increasing. The construction of railways has widely extended the trade within the islands, since it enables the manufactures to be distributed. The foreign trade amounts to about \$460,000,000 annually. Of this amount over

half is in imports. The leading countries with which this trade is carried on are Great Britain, India, the United States and China. In order of importance the exports are raw silk, cotton yarn, floss silk, manufactures, coal, copper, rice and tea. The leading imports are raw cotton and seed, sugar, iron and steel and other manufactures, including arms and machinery, cotton goods, woolen goods and petroleum.

**INHABITANTS AND LANGUAGE.** With the exception of the wilds of Yezo, peopled by 12,000 Ainos, the Japanese islands are inhabited by a single race, speaking various dialects of the same tongue. Probably the Japanese are a mixed race, the issue of the intermarriage of victorious Tartar settlers, who entered Japan from the Korean peninsula, with Malays in the south and people of the Aino race in the main island. Japanese annals contain tales of constant war with savages, and in comparatively recent times the Aino race occupied the northern extremity of Hondo. There are two distinct types of Japanese face; that which is found in art designs being the aristocratic and rarer type. It is distinguished by an oval head and face, rounded frontal bones, a high forehead, a nose curved and well shaped but not prominent, narrow and slightly oblique eyes, with an overlapping of the eyelid. In the man the face is almost hairless, with the exception of a narrow and short mustache. The complexion is pallid or slightly olive, and the expression is demure. The commoner type, almost universal in the northern districts, is full-eyed, flat-nosed and good-humored in expression. The stature of the race is small, and the trunk is proportionately long as compared with the legs, which are short. Intellectually, the Japanese are quick and alert. They are invariably of a pleasant temperament and readily adapt themselves to new conditions. This characteristic has been of the greatest importance to the nation in enabling it to introduce and profit by Western civilization, and it accounts very largely for the rapid development which the Japanese have made. The basic traits of their character, however, are unchanged.

The Japanese language, like the people, is the result of the combination of a number of languages, including the Tartar, Mongolian, Manchurian and Tungusic tongues. It differs from the Chinese in being polysyllabic. The alphabet contains 47 characters; the verb usually follows the noun, and the language is inflected. It is written in two forms, known as the *Katakana*, or half-letter signs, and the *Hira-kana*, or

full-letter signs. The former is much the simpler and is sometimes known as man writing. The Japanese language is somewhat difficult to learn, because its mastery necessitates the learning of a large number of different forms, known as idiographs. Students of the language believe that should it be written in the English alphabet, its mastery would be very much easier.

**GOVERNMENT AND RELIGION.** The present government is a constitutional monarchy based upon the constitution adopted in 1889, and in its form and functions it closely resembles the government of Germany, after which it was patterned.

The emperor remains the source of all laws, in so far that without the imperial approval no parliamentary measures can become law, but the making of laws is the function of the Diet, and no law can be put in force without its assent. The emperor determines the organization of every branch of the administration, appoints and dismisses all civil and military officers and has the supreme command of the army and navy. The rights of the people are safely guarded.

The Japanese parliament consists of a House of Peers and a House of Representatives, together called the Imperial Diet, which hold an ordinary annual session of three months—which, however, may be extended by imperial orders—and extraordinary sessions in urgent cases. For the upper house there are four classes of members: (1) members of the imperial family, holding office for life; (2) counts, viscounts and barons, not less than twenty-five years of age, elected by their fellows for seven years; (3) members nominated for life by the sovereign for meritorious service or for erudition, and above the age of thirty; (4) commoners elected in the prefectures and urban districts, one for each district, by the fifteen largest taxpayers. The lower house consists of 300 members, elected by ballot in 258 electoral districts. The suffrage is limited to males not less than twenty-five years old, who must have resided in the district at least a year before registration and must be paying direct national taxes to the amount of not less than fifteen dollars per annum, as well as an income tax. Candidates for election must be at least thirty years old. The duration of each parliament is four years, unless previously dissolved. Members of the government may sit and speak in either House, but can only vote in that of which they are members. For the purpose of local administration the country, with the exception of Yezo and Formosa, is divided into 46

districts, each having a governor and a local assembly elected by the people. These districts are again subdivided into villages, towns, municipalities and counties, each having its chief magistrate, council and assembly.

The religions of Japan are Shintoism, Buddhism and Christianity. Entire religious freedom is granted, and Christianity is making rapid progress. By far the largest proportion of the inhabitants are devotees of Shintoism, a religion based upon the worship of the goddess from whom the emperor is supposed to have descended. It is a mild form of spirit and ancestral worship and is the original religion of the country. Buddhism was introduced from China and engrafted upon Shintoism. Later this was modified by the introduction of Confucianism. While the government has not forbidden the extension of Buddhism, in 1868 it ordered the destruction of all Buddhistic symbols and images in temples which had formerly been consecrated to Shintu. See SHINTOISM; BUDDHISM.

**ARMY AND NAVY.** See ARMY, subhead *Japanese Army*; NAVY, subhead *Japan*.

**EDUCATION.** Education is general and compulsory. Women are educated with nearly as great care as men. There is a complete system of local elementary, middle and normal schools, and a central university in the capital, with five higher middle schools as feeders, one in Tokyo, the others at Sendai, Kyoto, Kanazawa in Kaga, and Kumamoto. There is also a higher normal school in the capital. The elementary school course extends over eight years (six to fourteen), four years being devoted to an ordinary and four to a higher course. There are also two universities, one at the capital and one at Kyoto. The former consists of six colleges, law, medicine, engineering, literature, science and agriculture. It is attended by about 3000 students. It includes upon its staff German, British, American and French professors and is very well supplied with the best of modern equipment. Other institutions in the capital are the Music Academy, the Technological School, the Dendrological School, the Nobles' School, attended by the young crown-prince, the Peeresses' School, the Girls' Higher School, the Ladies' Institute, the English Law School, the Higher Commercial School, besides eight other commercial schools in the country. Education is perfectly free from class restrictions, even the Nobles' School being by no means exclusively aristocratic. Mission schools have been doing excellent work. The capital is full of private schools and colleges.



## Japan

The printing press is very active. Daily newspapers abound and are sold astonishingly cheap.

**LITERATURE AND ART.** The oldest literature dates from the fifth and sixth centuries and is devoted almost entirely to the promulgation of religious doctrines. This continued until about the ninth century, when the introduction of Buddhism caused the development of another literature, based almost entirely upon the Chinese and containing many Chinese words. This was considered for centuries the classic literature of Japan and was learned and taught, but in the seventeenth and eighteenth centuries there was a revival of Shintoism in its pure form. The followers of this school attempted to establish a literature in pure Japanese, but they were not very successful. Later, as the nation came in contact with Western civilization and imbibed Western ideas, Japanese literature took on a new form, with many modern tendencies. This literature was at first repudiated by the educated class, but it has continued to gain in extent and influence, and at the present time Japanese literature embraces a wide range of subjects, including history, science, geography, religion, philosophy, drama, romances and poems. There are also numerous reference works compiled in the language, such as dictionaries and encyclopedias. The Japanese are especially fond of drama, and this class of literature has received considerable attention, most of their dramas being founded on national events. Critics of Japanese fiction assert that it contains many creditable works.

Japanese art has a wide range, as shown in their lacquer and pottery ware, carving in ivory and wood, the extensive ornamentation of their temples and other buildings, all of which are constructed of wood. Painting is universal. In its principles, style and technique Japanese painting resembles quite closely that of China, but in the selection of subjects it is original. Many art critics consider that it takes very high rank because of the excellence of its decorative applications, but it falls far below the standard of painting in modern Europe in completeness. In applications, Japanese art does not vary in important respects from that of European nations. Wall paintings are represented by pictures drawn upon sliding panels, which occupy the place of doors and walls in European and American dwellings. Often portions of the solid wall are ornamented in a similar manner. Painted screens also constitute an important feature of the decorative furniture of rooms. Another mode of decorating is that of fans.

## Japan

Books and rolls made up of drawings, with or without manuscripts, and loose sketches are made in unlimited numbers. Designs for engravers, for workers in embroidery and lacquer, for pottery and for sculptors are first made by painters. Much of the painting is executed on silk and paper especially prepared for the purpose. The colors were formerly prepared from native or Chinese material, but since the establishment of intercourse with European traders, most of them have been imported.

**CITIES.** The important cities are Tokyo, the capital; Yokohama, Nagasaki, Kobe, Hiroshima and Hakodadi, each of which is described under its title.

**HISTORY.** The reputed founder of the present dynasty in Japan was Jimmu Tenno, who ascended the throne in 660 B. C., but all Japanese history before 500 A. D. is to be classed as legendary. In 552 A. D. Buddhism was introduced from Korea and became, forty years later, the established religion. In the sixth century, direct relations were entered upon with China, and Chinese culture was rapidly assimilated. During the five centuries which ensued, the people made immense strides in civilization. A complete system of officialdom was organized under the rule of the Fujiwara family, whose members filled all the chief posts under the government.

The loss of power of this family and the growing weakness of the government favored the rise of the hitherto subordinate military class, which in the person of Yoritomo, who was created *shogun*, or general, in 1192, seized the reins of power. The usurpation of supreme authority by this officer led to the erroneous belief in Europe that down to 1868 there were two emperors in Japan, a *mikado*, or spiritual emperor, who did not govern, and a *shogun*, who really governed, though he paid formal homage to the mikado.

From the thirteenth to the beginning of the seventeenth century Japan was torn by civil strife. The military fiefs organized by Yoritomo raised up a feudal baronage, who succeeded in making themselves virtually independent of imperial power. At one time (1336-1392) two dynasties held sway, one in the North and one in the South. The shogunate itself lost its importance, but the military genius of Hidéyoshi prepared the way for its revival by Iyéyasu, the illustrious general and statesman, who gave a lasting peace to Japan. Iyéyasu in 1600 fixed his seat of government at Yedo, and, backed principally by the northern clans, was able to consolidate

## Japan

his power and to found a permanent succession, his dependents ruling at Yedo until 1868. From a collection of small, scattered villages this place soon grew to one of the most populous cities in the world.

The Portuguese, who first landed in Japan shortly before the middle of the sixteenth century, carried on a lucrative trade, but the ruling powers took alarm, ordered away all foreigners and forbade the introduction of the Christian religion (1624). The Portuguese continued to visit Japan until 1638, when they and their religion were finally expelled. From this time the Japanese government maintained the most rigid policy of isolation. No foreign vessels might touch at Japanese ports under any pretense, and Japanese sailors wrecked on any foreign shore were with difficulty permitted to return home. In 1853 Commodore Perry entered a Japanese harbor with a squadron of United States war vessels. He extorted a treaty of commerce from the shogun in 1854, and other countries followed the example of the United States until sixteen in all had obtained the same privileges.

The discontent which had for long been felt with the shogun gradually became general, and in 1867 he was compelled to resign. Yedo was recognized as the capital of the remodeled government, but its name was changed to Tokyo. Educators from the United States were invited to found a new educational system in Japan; British seamen reorganized the navy; French officers remodeled the army. Western laws were introduced, a new nobility was created on a Western basis and in 1889 a constitution was proclaimed. During the last quarter of a century the Japanese court has emerged from the seclusion in which it had maintained itself through the centuries.

In 1894, through trouble in Korea, Japan became involved in a war with China. The Japanese had a decided advantage in equipment and numbers, and the war had not been long in progress before it became clear that defeat for China was certain. The Chinese navy was almost completely destroyed, and in February, 1895, China was compelled to ask for peace. Japan took an active part in the rescue of the foreign legations in Peking during the Boxer uprising (See CHINA, subhead *History*). For the war with Russia see RUSSO-JAPANESE WAR. On August 23, 1914, Japan declared war against Germany, because that country paid no attention to the Japanese demand that Kiao-Chau be surrendered at once. Japan's declaration, it

## Jasmine

was officially stated, was made at the request of Great Britain. See WAR OF THE NATIONS.

**Japan Cur'rent.** See KURO SIVO.

**Japan'ning**, the act of applying varnish to such articles as wood, metal, leather, *papier-maché*, in imitation of the lacquered work of Japan and China. The article to be japanned, being made thoroughly dry, is first brushed over with two or three coats of seed-lac varnish, to form the *priming*. The next coat of varnish is mixed with the color desired, and where a design is intended it is now painted with colors. The whole is then covered with additional coats of varnish, which are dried and polished as applied. In japanning iron, the articles are coated with the varnish, then baked in an oven.

**Japheth**, *ja'feth*, a son of Noah (*Gen.* ix, 18), born when Noah was about 500 years old. His descendants, according to *Genesis* x, 5, peopled the isles of the Gentiles, and thus Japheth is often considered the ancestor of most European nations.

**Japura**, *zhah poo'rah*, or **Yapura** (sometimes called Caqueta in its upper course), a large river of South America, an affluent of the Amazon, with its source in the Andes of Colombia. It flows in a general east-southeast direction and forms for some distance the (disputed) boundary between Ecuador and Colombia. It passes through forests of Ecuador and Brazil for many miles and falls into the Amazon. Its length is more than 1300 miles, and it is navigable to Cupaty Falls, a distance of 620 miles. Above the falls it is again navigable for several hundred miles.

**Jasmine**, *jas'min*, or **Jessamine**, the name of a genus of plants mostly natives of warm parts



JASMINE

of Asia. The common jasmine is a native of South Asia. In northern lands it is cultivated



## Jason

as a garden shrub. It grows from six to ten feet high, has fragrant blossoms and resembles the evergreens. The flowers are used in making oil of jasmine, a delicate perfume. *Cape jasmine* is the name commonly applied to the gardenia, a subtropical plant belonging to the madder family. The flowers are large, white and fragrant, and the leaves are very beautiful. This species is a popular hothouse plant in England and the United States, except in the South, where it is a favorite garden shrub. The *Carolina jasmine* is a beautiful climbing vine which is common in South Carolina and other Southern states. The flowers are a deep, bright yellow, with a fragrance similar to that of the true jasmine. Still another species is the *Spanish jasmine*, which has very fragrant flowers from which oil is made.

**Ja'son**, in Greek legend, king of Iolcos in Thessaly, the leader of the Argonautic expedition. On his return from this quest he brought with him, as his wife, Medea, and she helped him to renew the youth of his father and to put to death his uncle Pelias, who had usurped the throne. After the death of Pelias, however, Jason was unable to keep possession of his throne and fled to Corinth, where some time later he deserted Medea and married Glauce, daughter of the king of that country. See ARGONAUTS; MEDEA.

**Jas'per**, an impure, opaque, colored quartz, less hard than flint or even than common quartz, but giving a spark when struck with steel. It is entirely opaque, or sometimes feebly translucent at the edges, and presents almost every variety of color. It is found in metaphoric rocks and often occurs in very large masses. Jasper admits of an elegant polish and is used for vases, seals, snuff boxes and other ornaments. There are several varieties, as red, brown, blackish, bluish, Egyptian. Agate jasper is jasper in layers with chalcedony (See AGATE). *Porcelain jasper* is only baked clay. The massive varieties form excellent building stone.

**Jasper**, WILLIAM (about 1750-1779), an American soldier, born in South Carolina. He distinguished himself at the siege of Fort Moultrie by leaping over the parapet and rescuing the colors which had been shot away. The commission as lieutenant which was offered him as a reward for this act, he refused to accept on account of his lack of education. In many later engagements he showed great bravery, and it was while trying to fasten the colors to a parapet during the attack on Savannah that he was killed.

## Java

**Jassy**, *yahs'se*, a town of Rumania, in Moldavia, on the Bahluu, several miles from the Pruth. There are many churches, among which are a cathedral, the Church of Saint Nicholas and the Church of the Three Saints. There are a university, a theological seminary, a school of art and a school of music. The manufactures are few, but the trade is of some importance, and a great deal of business is done at the fairs. Population in 1910, 79,680.

**Jats**, *jawts*, an Indian race occupying a large part of the Punjab and half of the Rajput states of India. They are a hardy, industrious, agricultural people, rearing large flocks of camels in the desert districts of Sind. Their religion varies with locality and embraces Brahmanism, the Sikh tenets and Mohammedanism. They number about 5,000,000.

**Jaundice**, *jahn'dis*, or **Icterus**, a condition of the body in which the skin turns to a greenish-yellow color. Jaundice is not itself a disease, but an indication of a disease of the liver, which prevents that organ from separating the coloring matter of the bile from the blood. The yellow color first appears in the whites of the eyes and then in the whiter parts of the skin.

**Java**, *jah'va*, an island in the Indian Archipelago, the most important of the Dutch East Indies. It is bounded on the n. by the Java Sea, which separates it from Borneo; on the e. by the Strait of Bali, which separates it from the island of Bali; on the w. by the Strait of Sunda, which separates it from Sumatra, and on the s. by the Indian Ocean. It is 660 mi. long and from 46 to 121 mi. wide and has an area of 50,390 sq. mi. The island is very mountainous and has a great number of volcanic peaks, some reaching an altitude of more than 12,000 feet above the level of the sea. Most of the active volcanoes are found in the west of the island and are noted for their great eruptions. In 1686 the peak of Ringhit, one of the loftiest, had an eruption which destroyed 10,000 lives. Among the best known peaks are Semeru, 12,040 feet high; Raun, 10,822 feet; Slamet, 11,247 feet; Géde, 9718 feet, and Salak, 7000 feet high. One of the best known eruptions was that of Krakatoa in the Strait of Sunda (See KRAKATOA). The south coast of Java is steep and rocky, with cliffs rising to a great height, while the north coast is low and swampy. Among the many rivers are the Solo, the longest, 175 miles; the Surabaya, or Brantes, and the Tji Manuk. There are many plains and valleys which are known for their wonderful fertility.

## Jay

Java is the richest and most fertile of all islands of its size. The distribution of vegetation is according to elevation. In the lowest zone are found rice, sugar cane, cotton, indigo and palm trees. In the plains and swamps are thickets of bamboo and many flowers. Above this, extending from 2000 to 4500 feet, are found coffee, tea, cinchona, many palms, fruits, teak, mahogany, sandal wood, rubber and many varieties of flowers and vines. Above this, up to 7500 feet, is a cool zone in which are found maize, tobacco, cabbages and potatoes. Extending from 7500 to 12,000 feet are found many varieties of European flowers, such as the daisy, buttercup, honeysuckle and violet. Among the many fruits are oranges, lemons, cocoanuts, bananas, mangoes and durians. Java is rich in forests, and teak is the chief product. The chief industry is agriculture, and rice is the most important crop. The chief imports are coal, fertilizers and petroleum, and the chief exports are sugar, coffee, tobacco, rice, quinine, tea, rubber, gutta-percha, cocoa and spices. Java is famous for its Biutenzorg, one of the finest botanical gardens in the world, surpassing all others in wealth and luxuriance of vegetation.

Java is divided into twenty-three residencies, controlled by a governor-general, who is assisted by a council of five, which serves as a legislative and advisory body. In each province there is also a resident, aided by assistant residents and subordinate officers called controllers. The governor-general resides in Batavia, the capital. The lower administrative offices are filled by natives.

The history of Java is unknown up to the eleventh century, when it became the site of powerful Hindu realms. The Hindus founded a dynasty and converted the natives to Brahmanism. This was overthrown by the invasion of the Mohammedans in 1478. In the early sixteenth century the Portuguese made their way to the island and were succeeded by the Dutch in 1595, who wrested from them the supremacy. At this time the two chief states were Mataram and Bantam. After the Dutch conquest was completed Mataram was divided into the sultanates of Sarakarta and Jokyokarta, which exist at present. Bantam disappeared a century ago. From 1811 to 1815 Batavia was in the hands of the English. Since then the Dutch have held the supremacy. Population in 1905, 30,098,000.

**Jay**, a common bird of the crow family, trim in shape and active in disposition; in some

## Jay

species bright colored and bearing a handsome crest. In the United States the saucy blue jay with its bright blue, black and white plumage is well known for its fantastic motions and its great skill in imitating the calls of other birds.



BLUE JAY

The *Canada jay*, or *whisky Jack*, or *lumber Jack*, is a bird of rather somber coloring, but with the bold, noisy and active habits of the other jays. The common European jay is cinnamon-colored, varied with white, black and blue. Its head is provided with a conspicuous black-marked crest.

**Jay**, JOHN (1745–1829), an American jurist and statesman. He was graduated from King's College and in 1766 was admitted to the bar. In 1774 he was chosen a delegate to the first American Congress, at Philadelphia, and was also a member of the second Congress. In 1778 he was appointed minister plenipotentiary to Spain and became one of the commissioners to negotiate a peace with Great Britain. Returning to the United States, he was appointed secretary of state and afterward chief justice. In 1794 he was sent as envoy extraordinary to Great Britain and concluded a treaty, called after his name, by which \$1,000,000 was given to Americans as compensation for illegal captures by British vessels, and the eastern boundary of Maine was fixed. The treaty was extremely unpopular in the United States, and it was ratified only after a bitter struggle. Jay served six years as governor of New York, then retired to private life. See JAY TREATY. (See illustration on next page.)



## Jayhawker

**Jayhawker**, the name applied to one of a class of irregular, lawless soldiers or bush-rangers in the Southern and Western states of the



JOHN JAY

Union. The term arose in Kansas during the fight over slavery.

**Jay Treaty**, the name given to a treaty between Great Britain and the United States, negotiated and signed for the United States by John Jay, in 1794. It provided for the evacuation of the forts in the Northwest by the British, for a commission to determine the northeast boundary between Canada and the United States and for compensation to the United States for illegal captures of American merchantmen after the Revolutionary War. The treaty was exceedingly unpopular in America, since it contained no reference to the impressment of seamen or to the kidnaping of negroes by the British army, and because it placed restrictions on United States trade with the West Indies. Charges of bribery and corruption were leveled at Jay and even at Washington, and the ratification of the treaty was made a party issue, but was finally accomplished after a hard struggle.

**Jeannette**, *jen net'*, PA., a borough in Westmoreland co., 26 mi. s. e. of Pittsburg, on the Pennsylvania railroad. It is in an agricultural and coal-mining section and is supplied with natural gas. The manufactures include glass and rubber goods, fans, electro-carbons and other articles. Population in 1910, 8077.

## Jefferson

**Jeannette Expedition.** See NORTH POLAR EXPLORATION.

**Jefferson**, JOSEPH (1829-1905), an American actor, born in Philadelphia. His great-grandfather was a member of Garrick's company at Drury Lane, while his father and grandfather were well-known American actors. Jefferson was on the stage from his very infancy, appearing as a child in *Pizarro* when only three years of age, and dancing as a miniature "Jim Crow" when only four. For many years he went through the hard training of a strolling actor and then played in New York, where in 1857 he made a hit as Doctor Pangloss, in the *Heir-at-Law*, and in 1858 created the part of Asa Trenchard in *Our American Cousin*, Sothorn playing Lord Dundreary. Some time later he assumed for the first time the rôle of Caleb Plummer in *The Cricket on the Hearth*.

In 1865 he visited London and at the Adelphi Theater played for the first time his world-famous part of Rip Van Winkle in the play arranged by Boucicault from Irving's story. The character was a perfect work of art—beautiful in conception, subtle and delicate in execution. After a long run with Rip Van Winkle, Jefferson



JOSEPH JEFFERSON

returned to his earlier parts, and in 1863 he made for himself another famous rôle, as Bob Acres in *The Rivals*. From 1880 until his death



## Jefferson

Jefferson did not attempt new rôles, but as Rip, Caleb Plummer and Bob Acres, he retained all his early popularity. He had considerable talent as a painter, and many of his pictures, produced for recreation and amusement, have been given high praise by critics. Aside from his remarkable ability as an actor, Jefferson's high character and charming personality won for him a high place in the esteem of the American people.

**Jefferson, THOMAS** (1743-1826), an American statesman, author of the Declaration of



THOMAS JEFFERSON

Independence, third president of the United States, born in Albemarle County, Va. He was educated in the common schools and under private instructors, later studied at William and Mary College and then studied law, being admitted to the bar in 1767. He was elected to the lower house of the colonial legislature in 1769 and took a prominent part in the advocacy of radical measures of resistance to Great Britain. In March, 1773, Jefferson, with Patrick Henry and other kindred spirits, formed a committee of correspondence, an action which led to a second dissolution of the legislature. He took a prominent part in the agitation in favor of the Continental Congress, and a tract which he had drawn up as instructions to Virginia's delegates was later published as *A Summary View of the Rights of British America*, which had a

## Jefferson

wide circulation and powerful influence. In 1775 he was elected to the Continental Congress and there rose to prominence as a writer of documents, though he did not excel as a debater. In the spring of 1776 he was appointed on a committee to draw up a declaration of independence and was the principal author of the document.

He retired from Congress in the fall, devoting himself to political work in his own state, where he had an important influence in incorporating democratic ideals in the new constitution and laws. He served in the legislature and as governor, and at the close of the war he was chosen one of America's commissioners of peace, but did not sail, the work having been practically accomplished before he was ready to leave America. Jefferson reëntered Congress in 1783 and for a year performed important service. In the following summer he was sent to Europe with Franklin and Adams to make commercial treaties, and in 1785 he became sole American representative in France. For five years he remained abroad and, though not negotiating many important treaties, he did much to raise the prestige of the American government and to popularize the American cause.

He returned to America and reluctantly accepted the office of secretary of state in Washington's first administration. Here he first came into conflict with his great rival, Alexander Hamilton, whose sympathies with a strong central government were diametrically opposed to Jefferson's instincts. This opposition became particularly acute during the trouble between France and England in 1793, when Jefferson's followers desired not only recognition for Genet (See GENET, EDMUND CHARLES), but wished the United States to take actively the side of France. He retired from office in the same year, and at the close of Washington's second term he became the candidate of the Anti-Federalists for president; but being defeated by Adams, Jefferson became vice-president. In this position he also came into conflict with his superior officers, and at the passage of the Alien and Sedition Laws he secured the adoption of the famous Kentucky and Virginia Resolutions, of which he was the author (See KENTUCKY AND VIRGINIA RESOLUTIONS).

The campaign of 1800 was extremely bitter, and Jefferson and Burr, the two Republican candidates, received the same number of votes, Jefferson finally being chosen by the House of Representatives. He immediately instituted



## Jefferson City

changes in the customs of the White House, particularly emphasizing his democratic ideas. The most important event of his first administration was the purchase of Louisiana. The government was also concerned with a small war with the Barbary pirates. Jefferson was reelected in 1804 and was immediately confronted with foreign questions of great importance, chief of which was the attitude of Great Britain toward American merchantmen. Jefferson attempted to apply a policy of non-intercourse and commercial restriction, but he was unsuccessful. He retired from office in 1809 and never again entered public life, but continued to write for the press upon public issues. During his retirement he founded the University of Virginia, which he considered one of the two greatest achievements of his career.

In many respects, Jefferson was in advance of his time in his political and social ideals, but he was not a strong executive and was often indiscreet in his advocacy of his favorite policies. As some one has said, he was a friend of the common people, "who not only served them, as many have done, but who honored and respected them, as few have done." In impressing this democratic ideal upon the American government and society, he performed his most notable service. See Morse's *Thomas Jefferson* in the American Statesmen Series.

**Jefferson City**, Mo., the capital of the state and the county-seat of Cole co., 125 mi. w. of Saint Louis, on the Missouri Pacific, the Chicago & Alton, the Missouri, Kansas & Texas and other railroads. The city occupies a lofty site near the geographical center of the state. It is the seat of Jefferson City College and of Lincoln Institute, a normal school for negroes. There are Carnegie, state and supreme court libraries, about ten churches and five hotels. Among the other prominent buildings are the state capitol, the penitentiary, the armory, the governor's mansion, the supreme court building and the United States courthouse. The city is an important trade center for a rich agricultural and mining region. There are railroad shops of the Missouri Pacific and extensive manufactories of agricultural implements, shoes, clothing, flour, foundry products, brick and other articles. The place was settled in 1826 and was incorporated in 1839. Population in 1910, 11,850.

**Jeffersonville**, IND., the county-seat of Clark co., on the Ohio River opposite Louisville, Ky., and on the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & Saint Louis and

## Jelly

other railroads. There are extensive manufactories of boats, railroad cars and various smaller articles. The state reformatory for men and a United States quartermaster's supply depot are here. Population in 1910, 10,412.

**Jeffreys**, *jej'riz*, GEORGE, Lord (1648-1689), an English judge. Soon after beginning his professional career he was chosen recorder of London, and he was appointed, successively, a Welsh judge and chief justice of Chester. In 1680 he was created a baronet and was later appointed chief justice of England. He was one of the advisers and promoters of the arbitrary measures of James II; and for his sanguinary and inhuman proceedings against the adherents of Monmouth on the "bloody western circuit," he was rewarded with the post of lord high chancellor (1685). On the arrival of William III, the chancellor, who was attempting to escape, disguised as a seaman, was detected and committed to the Tower, where he died.

**Jehoshaphat**, *je hosh'a fat*, (Jehovah's judgment), son of Asa and fourth king of Judah, about 896-871 B. C. He was noteworthy for his strenuous endeavors to abolish the use of idols.

**Jeho'vah** (Hebrew, *Yahveh*), the popular pronunciation of the sacred name of God among the Hebrews, represented in the text of the Old Testament by the four consonants J (or Y), H, V, H. The Hebrews cherished the most profound awe for this name, which led them to avoid pronouncing it and to substitute the word *Adonai*, signifying *the lord*. This custom still prevails among the Jews. In some portions of the Pentateuch Jehovah is the name regularly applied to God, in others Elohim, which has led to a theory of two authors respectively for these portions.

**Je'hu**, the founder of the fourth dynasty of the kingdom of Israel. He was a commander in the army of Jehoram, when Elisha sent one of the "children of the prophets" to consecrate him king of Israel at Ramoth-Gilead, about 842 B. C. He immediately attacked Jehoram, whom he slew in battle, and he then entered upon a work of extermination in which were slain seventy of Ahab's children, Jezebel, Ahaziah, king of Judah, and forty-two brothers of Ahaziah. He died after a reign of twenty-eight years. His name occurs more than once on the monuments discovered at Nineveh.

**Jelly**, a name for such substances as are liquid when warm, but which coagulate into a gelatinous mass when cold. Fruit jellies are made by pressing out the juice of the fruit and

## Jellyfish

boiling it with a certain proportion of sugar. They are highly prized as delicacies. Animal jelly is prepared from the soft parts of animals, and even from bones, when sufficiently crushed. It is a colorless, elastic, transparent substance, without taste or smell, and is soluble in warm water. See GELATIN.

**Jel'lyfish**, the popular name of several different animals found in the sea and often called *sea blubbers* or *sea nettles*, from their appearance or from their stinging properties. When in the water they present a singularly beautiful appearance, one of the most common being a clear, crystalline bell, which swims gracefully through the water by alternately expanding and contracting its body. They move rapidly and seize their prey with their long stinging tentacles.

**Jemappes**, *zhe mahp'*, **BATTLE OF**, a battle at the village of Jemappes, in the province of Hainaut, Belgium, fought Nov. 6, 1792, between a French army of 46,000 men under Dumouriez, and an Austrian force of 26,000 under the duke of Saxe-Teschen. It resulted in a brilliant French victory and was notable for several dramatic episodes, among which was the gallant charge led by the future king of France, Louis Philippe, and the rally of French soldiers under the inspiration of the strains of the Marseillaise Hymn.

**Jena**, *ya'nah*, a town of Germany, in the grand-duchy of Saxe-Weimar-Eisenach, 12 mi. e. of Weimar, on the Saale. It is a place of little importance except for its university, which was opened in 1558. Population in 1910, 38,487.

See JENA, BATTLE OF.

**Jena**, **BATTLE OF**, a battle fought at Jena, October 14, 1806, between the Prussians under Prince Hohenlohe and the French under Napoleon. The French, who considerably outnumbered the Prussians, were completely victorious.

**Jenghis Kahn**, *jen'giz kahn*. See GENGHIS KAHN.

**Jenks**, JEREMIAH WHIPPLE (1856- ), an American writer and teacher of political economy, born at Saint Clair, Michigan. He was educated at the University of Michigan and later in Germany, where he took his doctor's degree. Upon his return he was admitted to the bar. He later taught successively in Mount Morris College, Knox College, Indiana University and, finally, Cornell University, where he became professor of political economy and politics. He attained a high reputation as a student of modern industrial problems and was the expert agent of the United States Industrial

## Jerboa

Commission in the investigation of trusts in the United States and Europe. Later he was connected with the department of labor as special industrial expert and made several trips to Europe and the Orient in the study of special questions. He has published many magazine articles, besides several books, among which *The Trust Problem* is perhaps best known.

**Jen'ner**, EDWARD (1749-1823), an English physician, celebrated for having introduced the practice of vaccination as a preventive of the smallpox. He studied at London and afterward settled in Gloucestershire as a medical practitioner. About 1776 the belief common among the peasants that casual cowpox acquired in milking cows was a preventive of smallpox caused him to direct his inquiries to the subject and led to the introduction of the process of vaccination in 1796. His method at first met with great opposition from the medical profession, but was ultimately accepted universally, both by his own and foreign nations. See VACCINATION.

**Jephthah**, *jeft'hah*, one of the Hebrew judges who defeated the Ammonites and, having rashly made a vow that if he was victorious he would sacrifice to God as a burnt-offering whatever should first come to meet him from his house, was met on his return by his daughter, his only child, whom he sacrificed, in consequence, to the Lord.

**Jerbo'a**, a genus of small rodents having extremely long hind limbs, which give them an



JERBOA

extraordinary power of leaping, so that their movement seems more like flying than running. The fore limbs are armed with short, powerful claws, with which the animal excavates its burrows and extracts the roots on which it chiefly lives. Jerboas live in communities, are nocturnal in their habits and hibernate during the colder seasons, though they do not store food for the winter. The jerboas are found



## Jeremiah

chiefly in Asia and northern Africa. The typical species is the Egyptian form. The jerboa is closely allied to the American jumping mouse, or deer mouse. See DEER MOUSE.

**Jeremi'ah**, the second of the great prophets of the Old Testament. He flourished during the darkest period of the kingdom of Judah, under Josiah, Jehoahaz, Jehoiakim, Jeconiah, or Jehoiachin, and Zedekiah. He was called to the prophetic office about 629 B. C., in the reign of Josiah, and he lived to see the capture of Jerusalem by Nebuchadnezzar in 586 B. C. Nebuchadnezzar offered him a home at Babylon, but he preferred to stay among the wretched remnant of the people left in Judah. He is said to have been stoned to death in Egypt by some of his countrymen who were irritated by his rebukes. Jeremiah wrote the books *Jeremiah* and *Lamentations*, and probably some of the *Psalms*.

**Jeremiah**, LAMENTATIONS OF. See LAMENTATIONS.

**Jerez de la Frontera**, *ha'rath da lah frohn ta'rah*, a city in the Province of Cadiz, Spain, 16 mi. n. e. of Cadiz. It is noted for its wine, well known under the name of sherry, which is exported in large quantities. There are two parts to the city, the older of which is surrounded by the remains of old Moorish walls. Among the noteworthy features are an old Moorish castle, several theaters, a library and numerous educational institutions. Near the city is the La Curtuja convent, famous for its fine architecture. Population in 1910, 62,628.

**Jericho**, *jer'e ko*, a town of ancient Judea, on a plain about 18 mi. n. e. of Jerusalem, noted, especially in Solomon's time, for its balsam gardens and its thickets of palm trees and roses. It was the key of Palestine and was therefore invested by the Israelites who had passed the Jordan under Joshua to conquer this country. The account of the invasion and capture is told in the book of *Joshua* II, V-VII. Joshua pronounced a curse upon him who should rebuild the city, but it was rebuilt in the days of Ahab. It grew to considerable importance and is often spoken of in later history. Herod favored it and resided there, and Christ performed many miracles at Jericho. Vespasian destroyed the city, but it was again rebuilt. Its site is now occupied by the small village of Er-Riha.

**Jericho, Rose** a small plant belonging to the mustard family, which came originally from Arabia. As soon as it is mature, the leaves

## Jerome

fall off, and the stems, as they dry, close in toward the center, making a ball of the whole plant, which breaks loose and rolls over the ground. When it reaches water the branches expand and turn green again and the seeds



JERICHO ROSE

fall out. These plants may be often found in the markets, and are rather interesting, as they can be made to brighten up and expand or contract into gray balls as they are kept in water or are dried.

**Jerobo'am**, the name of two kings of Israel. JEROBOAM I, the son of Nebat, on Solomon's death, 973 B. C., was made king of the ten tribes who separated from Judah and Benjamin. He died in the twenty-second year of his reign (*II Kings* XI, XII, XIII). JEROBOAM II, the most prosperous of the kings of Israel, reigned 823-782 B. C. He repelled the Syrians, took their cities of Damascus and Hamath and reconquered Ammon and Moab. Licentiousness and idolatry were prevalent during his reign. Amos and Hosea prophesied during this time.

**Jerome'**, JEROME Klapka (1859- ), an English humorist. He was educated at the Philological School of Marylebone and was successively actor, journalist, tutor, stenographer and clerk. In 1889 he published his *Idle Thoughts of an Idle Fellow*, which gained for him wide popularity. Among his other books may be mentioned *Three Men in a Boat*; *John Ingerfield*, and *Other Stories*; *Stage Land*; *Novel Notes*, and several good comedies.

**Jerome**, SAINT, in full, Eusebius Hieronymus Sophronius, (?-420), one of the most learned fathers of the Latin Church, was born

## Jerome

sometime between 331 and 345 in Dalmatia. His parents were both Christians and were wealthy. He was baptized in Rome, went to Antioch, in Syria, in 373 and in the following year retired to the desert of Chalcis, where he passed four years in severe mortifications and laborious studies. He left his solitude to be ordained priest at Antioch, went to Constantinople to enjoy the instruction of Gregory of Nazianzus and in 382 returned to Rome, where his expositions of the Holy Scriptures gained many adherents. His Latin version of the Old Testament from the original language was the foundation of the Vulgate. He took an active part in many controversies, especially in those regarding the doctrines of Origen and Pelagius.

**Jerome, WILLIAM TRAVERS** (1859– ), an American lawyer, born in New York. He was educated at Amherst College and in law at the Columbia Law School, being admitted to the bar in 1884. After serving seven years as a justice of the court of special sessions in New York City, he was elected district attorney of New York County as a Democrat in 1901 and was reelected as an independent candidate after a memorable campaign in 1905.

**Jerome of Prague** (1360–1416), a Bohemian reformer, in faith and sufferings the companion of the famous John Huss. Together they made a vigorous crusade against the dissoluteness of the clergy, the worship of relics and other faults of the Church. When Huss was imprisoned in Constance, Jerome hastened to his defense, but was seized and carried thither in chains (1415). After much suffering he consented to recant his heresies, but on being given a new examination, he solemnly retracted his recantation and made a vigorous vindication of the principles of Huss and Wyclif. On May 30, 1416, he was burned at the stake, and his ashes were thrown into the Rhine.

**Jersey, *jur'zy***, the largest and most valuable of the Channel Islands, about 15 mi. off the northwest coast of France (See CHANNEL ISLANDS). It is 11 miles long and 4 to 6 miles wide and has an area of 45 square miles. The climate is peculiarly mild and agreeable. Wheat is the principal cereal raised, and large quantities of grapes, peaches, melons, pears and other fruits are exported. Cows of the famous Jersey and Alderney breeds are reared and exported in great numbers. The principal town is Saint Helier. Population in 1911, 51,903.

**Jersey City, N. J.**, a city and the county-seat of Hudson co., the second largest city of New

## Jerusalem

Jersey, situated in the northeast part of the state, on the termini of twelve lines of railway, including the Central of New Jersey, the Erie, the Pennsylvania, the West Shore and other railroads. It is connected with New York City by ferries and tunnels, and several lines of trans-Atlantic steamships dock at this point. Among the prominent buildings are the city hall, the Fourth Regiment Armory, Saint Francis and Christ hospitals, a historical museum and a public library. The educational institutions include Hasbrouck Institute and Saint Peter's College. Jersey City Heights, practically the southern ridge of the Palisades, contains many beautiful residences and fine streets. West Side Park, now being built, will cost \$1,500,000. A boulevard 100 feet wide and 18 miles long traverses Hudson County from north to south and commands an extensive and impressive view. The shipping and railroad facilities of Jersey City are excellent. There are trolley connections with all the large cities of the state, besides local lines throughout the tributary region, and among the industries are locomotive and railroad supply works, steel, foundry and machine shops, grain elevators, sugar refineries and manufactures of crucibles, glass, zinc, chemicals, jewelry, fireworks, lead pencils, chains, rubber goods and copper ware. Foreign and domestic commerce in iron, coal, produce and general merchandise is very extensive. There are large stockyards in the vicinity. The site of Jersey City was formerly called Paulus Hook, but in 1820 it was chartered as the City of Jersey and in 1838 as Jersey City. Population in 1910, 267,779.

**Jeru'salem**, the chief city of Palestine, one of the most ancient and interesting cities in the world. It stands on an elevated site about 2500 feet above the sea, within the fork of two ravines, the valley of Jehoshaphat on the east, and the valley of Hinnom on the south and west, while the Tyropoean, a third valley, traverses it from south to north. The city stands on four hills, once separated by deep valleys, which are now partially filled up by the debris of successive ruins. Zion, the most celebrated of these summits, on the southwest, rises to a height of 300 feet above the valley of Hinnom. Mount Moriah is on the east, and on the northeast is Mount Bezetha, a little higher than Moriah. Mount Akra is on the northwest. The Mount of Olives is to the east of the city.

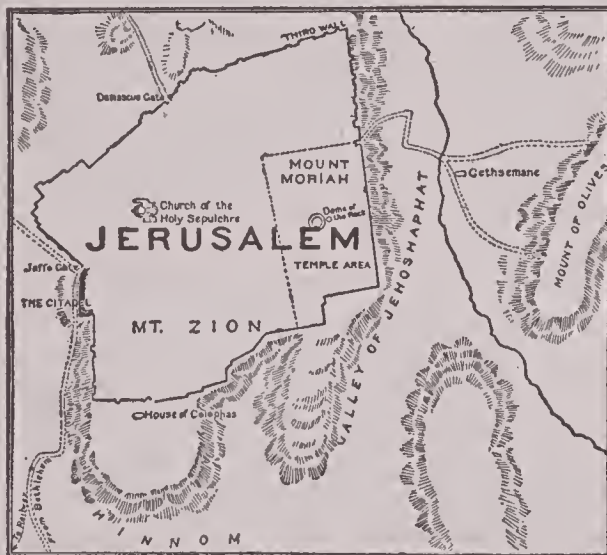
Jerusalem is not mentioned by name in



## Jerusalem

## Jerusalem

historic annals until about 1500 B. C., when it was in the hands of the Jebusites. The lower part was taken from them by Joshua, but the upper part continued in their possession till the time of David, who captured the citadel and took up his residence in the stronghold of Zion, making the city the capital of his kingdom and calling it "City of David." It reached the height of its glory under Solomon, who erected the Temple on Mount Moriah. In 586 B. C. Nebuchadnezzar took and destroyed the city after a long siege and carried off as captives to Babylon those of the inhabitants whom the



sword had spared. On their return from captivity the Temple was rebuilt, in 515 B. C., but the walls were not rebuilt until the time of Ezra and Nehemiah, 255 B. C. In 332 B. C. the city passed into the hands of Alexander the Great. It regained a considerable degree of prosperity by 168 B. C., but in that year it was sacked and its walls leveled by Antiochus of Syria. Under the Maccabees, Jerusalem, in common with Judea, once more became independent, in 165 B. C. It next became tributary to Rome. It had been greatly beautified and enriched with a fine new Temple by Herod when Jesus Christ appeared. In 66 A. D., Jerusalem was taken by a party of Jews, who had revolted against Rome. Titus, the son of the emperor Vespasian, regained it in the year 70 A. D., after a siege which was one of the most terrible in history. The Temple was burned, and the city was utterly destroyed. In 131 Hadrian ordered the city to be rebuilt, but it continued depressed till the beginning of the fourth century. Rome having become more Christian, Jerusalem then shared in the benefit and assumed the appearance of a distinguished

Christian city under Constantine the Great. Constantine built the first Church of the Holy Sepulcher over the supposed site of Christ's burial, but this church was burned by the Persians in 613. This period of prosperity, prolonged by a succession of Christian emperors, was suddenly terminated in 636 by the conquest of the Mohammedans under the Arabian caliph Omar. In 1099 the Crusaders took Jerusalem by storm and made it the capital of a Christian monarchy, which with difficulty maintained its existence till 1187, when it was finally overthrown by Saladin and the city again came into the power of the Mohammedans. In 1517 Jerusalem fell into the hands of the Turks and has remained to this day a part of the Ottoman Empire.

Modern Jerusalem is surrounded by a high wall, pierced by eight gates, through which roads lead into the surrounding country. Jaffa, Bethlehem, Hebron and Jericho and the Dead Sea are all connected with the city by good roads. The wall as it stands at present was built by Solyman the Magnificent in the sixteenth century and occupies practically the same place as the walls during the time of the Crusades. The most important gates are the Jaffa gate, at the west; the Damascus gate at the northwest, and another gate which has been opened to the north of the Jaffa gate. Outside the walls to the northwest is a suburb, the new part of the city. The town within the walls covers an area of 210 acres, 35 of which are occupied by the Temple enclosure, which is called Haram-esh-Sherif. The remaining space is divided into different quarters, the two Christian quarters taking up the western portion, the Mohammedans having the northeast and the Jews the southeast. The walls are irregular, and the city is also laid out in the most irregular way, with narrow, tortuous streets. The chief interests in Jerusalem are still its historical places. The Temple, or Dome of the Rock, sometimes wrongly called the Mosque of Omar, stands upon the summit of Mount Moriah. This building has eight sides, each 68 feet long, and four doorways, and the whole is covered with porcelain tiles of various colors. The dome is 98 feet high and 75 feet in diameter and is made of wood. The present shrine was built in 688 by Abd-el-Melek. The Church of the Holy Sepulcher is one of the most interesting buildings and is believed by many to cover the tomb of Christ. The first church was built by Constantine in 326 A. D., and since that time

many churches have been built. The present building was completed in 1810. The Tower of David, the mosque known as the Tomb of David, and the Via Dolorosa, or "Way of Sorrows," are other interesting features.

Jerusalem is a busy mercantile place; it has modern hotels, various educational and religious institutions and numerous stores, all of which are in strong contrast to the Jerusalem of the past. The principal industries now are the manufacture of ornaments, carved in mother-of-pearl, and various articles made from olive wood. These articles find ready sale among the 15,000 to 20,000 tourists and pilgrims who annually visit the city. The climate is not unhealthful, but the unsanitary condition of the city, its filthy streets and crowded population, result in a heavy death rate. The permanent population of the city is not far from 60,000, of whom over half are Jews, one-sixth Christians and about the same number Mohammedans.

**Jessamine**, *jes'sa min*. See JASMINE.

**Jester** or **Court Fool**, a buffoon or person maintained by the noble and wealthy to make sport by jests and merry conceits for them and their friends. The professional jesters usually wore a dress of motley colors and a cap, or cowl, of gay colors, furnished with bells and asses' ears, or crowned with a cock's comb. Several of the court jesters made names for themselves in history.

**Jesuits**, *jez'u its*, or **Society of Jesus**, the most celebrated of all the Roman Catholic religious orders, was founded in the sixteenth century by Ignatius Loyola (See LOYOLA, IGNATIUS OF), and was established by a papal bull in 1540. The first general of the order was Loyola. The members, in addition to the usual vows of poverty, chastity and implicit obedience to their superiors, were bound by a fourth vow, to go whithersoever the pope should send them, as missionaries for the conversion of infidels and heretics, or for the service of the Church in any other way. Popes Paul III and Julius III, seeing what support they might have in the Jesuits against the Reformation, granted to them privileges such as no body of men, in Church or State, had ever before obtained. Their general was invested with unlimited power over the members, the dispersion of whom throughout society was made the basis of the order. The constitution of the body was drawn up in great part by Loyola himself, but the second general, Laynez, had much to do in directing its early movements.

The order soon approved itself to the pope by its zealous activity and its success against the growing power of Protestantism. The Jesuits carefully avoided all appearance of spiritual pride, often wore the ordinary garb of the country and generally dealt with all matters in a spirit of worldly policy and accommodation to circumstances. In Europe they became the teachers of the higher classes and carried out on a grand scale improvements in the system of instruction. The young nobility were sent almost exclusively to them, even from Protestant countries, to be educated.

At an early date the Jesuits began to send missionaries to heathen nations. The greatest of these was Saint Francis Xavier, a close friend of Loyola. He is often called the "Apostle of the Indies," because his first work was done in India. He was not only the means of converting thousands to Christianity, but had a supreme faculty for organizing his converts into communities under the care of competent native teachers. His work in Japan was also remarkably successful.

The story of the work of the Jesuit missionaries in America is most thrilling. Garnier, Daniel and others were shot, and De Brébeuf and Lallement were burned at the stake. Marquette discovered the Mississippi and explored it as far as the mouth of the Arkansas. Other Jesuits from Mexico reached the Pacific coast and established the missions of California. The records, or *Relations*, of the French missions have been published recently in America, forming 72 volumes of valuable historical matter. Members of the English and Spanish Orders also came to America at an early date, and many of their records have also been preserved.

Wherever the Jesuits went they were considered as the special upholders of the papacy and the most faithful defenders of the Roman Catholic Church. This close adherence to the pope often made their position insecure, even in Catholic countries. Finally, in 1764, the united efforts of their enemies in France brought about their suppression by royal edict throughout the French dominions. This example was followed within a few years by the other Bourbon courts—Spain, Naples, Parma and Modena. In 1773 Pope Clement XIV issued the brief *Dominus ac Redemptor Noster*, by which, without entering in any way into the justice of the charges made against the Jesuits, but acting solely on the motive of "the peace of the Church," he sup-



## Jesuits' Bark

pressed the society in all the states of Christendom. In all the Catholic countries, except Spain and Portugal, the members were, however, allowed to remain, and as individuals they wisely continued their ministerial or literary work. In 1814, by the bull *Sollicitudo Omnium Ecclesiarum*, the Order was reestablished in all Christendom.

Since then the Society of Jesus has flourished in all parts of the world. It is the most zealous of all missionary bodies of the Church and has over 3000 priests in heathen lands. They are foremost, too, in the work of education. Their preparation for this work is comprehensive and thorough, consisting of a seven years' course of study, embracing the humanities, philosophy and science, and must be completed by each candidate for orders. He is then sent to teach in a Jesuit college for five years. During this time he is not confined to one class, but is advanced each year with his pupils, thus providing for his own mental development as well as the consistent progress of his pupils. The Jesuit system of education was completed in 1599 under Acquaviva, the fifth general of the society. At the time of his death in 1615 the society had 272 colleges. By the middle of the eighteenth century there were 728 colleges with about 300,000 students. Notwithstanding the losses sustained during the period of suppression, in the year 1900 the Jesuits had more than 60,000 students in their colleges. In the United States they have colleges in New York, Baltimore, Boston, Worcester (Mass.), Washington, Georgetown (D. C.), Jersey City, Fordham (N. Y.), Cleveland, Cincinnati, Buffalo, Detroit, Milwaukee, Chicago, Omaha, Saint Louis, Galveston, Mobile, New Orleans, St. Mary's (Kan.), Denver, San Francisco, Santa Clara (Cal.) and Spokane.

**Jesuits' Bark.** See PERUVIAN BARK.

**Jesus Christ**, the founder of Christianity, was born in Bethlehem, Judea, according to the generally accepted chronology in the year of Rome 750, that is, 4 B. C. This apparent discrepancy in date is due to an error that was made when the Christian calendar originated with Dionysius, A. D. 556. He fixed upon the year of Rome 754 as that in which Christ was born. Later information proved beyond a doubt that this date should have been 750, which gives the birth of Christ four years before the beginning of the Christian era according to the calendar of Dionysius. The mother of Jesus was Mary, who was probably a descendant of David, and her husband, Joseph, was also a descendant of

## Jesus Christ

the same family. The birth of the holy child occurred in a manger at a public inn in Bethlehem, where Joseph had gone to be registered in accordance with the Jewish law relating to taxation.

The miraculous conditions connected with his birth prove to the satisfaction of most followers of Christianity that Jesus was of divine origin. His parents remained at Bethlehem for some time. The infant Savior was circumcised on the eighth day, and at the end of the fortieth day he was presented in the Temple, and his mother, according to the Jewish law, made the customary offers for her purification. Soon after this he was visited by wise men, or Magi, from the East, who claimed to have been guided to the spot where he was by the miraculous appearance of a star. Inquiries of these men as to where the child who was to be king of the Jews was born, led Herod (at that time Roman ruler of Judea) to cause all the male children in Bethlehem under three years of age to be put to death. Joseph, however, was warned by an angel, and he fled with Mary and Jesus into Egypt, where he remained for a few months, until after Herod's death, when the holy family returned and took up their residence at Nazareth. Here Jesus lived and grew to maturity, and because of this he is frequently called the Nazarene.

Of the boyhood and youth of Jesus almost nothing is known. The only authentic account given is that of his appearance in the temple when twelve years of age (*Luke II, 46-50*). All legends concerning his life previous to his public ministry are without foundation, but it is probable that he remained in the family at Nazareth and engaged in the same work as his father, who was a carpenter.

The public ministry of Jesus was preceded by the preaching of John the Baptist, who proclaimed the coming of the kingdom of God and called men to repentance. Jesus was baptized by John, and at the time his divine nature was manifested by the miraculous appearance of the holy spirit in the form of a dove and by a voice from heaven saying, "This is my beloved son, in whom I am well pleased." Following the baptism, Jesus retired into the wilderness of Judea, where he was subjected to various temptations. After the temptation he was pointed out by John as the Son of God, and some of John's disciples from that time became his followers. His first public appearance was at the marriage in Cana of Galilee, where he wrought the miracle of turning water into wine. He then visited

## Jesus Christ

Capernaum, appeared in Jerusalem at the time of the Passover and revealed his majesty and power by cleansing the Temple of those who were changing money and selling animals for sacrifice. His works and teachings immediately aroused the opposition of the leaders of the Jews and, finding that this work in Judea was to be rejected, he departed into Galilee. During the remainder of the first year of his ministry he preached at Nazareth, where the people attempted to cast him over a precipice because of his teachings; then at Capernaum, where he called the apostles Andrew, Peter, James and John. After the calling of his disciples he began his first circuit through Galilee. During this occurred the Sermon on the Mount; also the Sermon in the Boat, which was followed by the miraculous draught of fishes. Near the close of this year he called Levi, or Saint Matthew, who became one of his most devoted followers.

The second year's ministry began with the attendance upon the Passover at Jerusalem and the healing of the lame man at the Pool of Bethesda. Following this were several other miracles, followed by discussions with the Pharisees and other leaders of the Jews, in which Jesus set forth the doctrine of the new dispensation and showed clearly the difference between the underlying principles of the Jewish law and the ceremonials largely practiced at that time. This increased the already growing opposition and was followed by the sending out of the twelve apostles to promulgate the doctrine of Christianity. After the visit to Jerusalem, Jesus began his second general circuit through Galilee. This circuit was characterized by the performing of a number of miracles and the relating of some of the most important parables in the New Testament, among them those of the sower, of the tares, of the mustard seed, of the leaven and of the treasure. This was followed by the third general circuit, during which occurred the death of John the Baptist, the feeding of the five thousand and the walking on the water.

The third and last year of Jesus's ministry was by far the most important and included many discourses, miracles and parables. The great events of this year were the Transfiguration, his appearance at the Feast of Tabernacles, the raising of Lazarus, which so aroused the envy of the Jews that they resolved upon putting him to death, and the events of the last week before the Crucifixion, generally known as Passion Week. As this week drew near, Jesus prepared to eat the last Passover with his dis-

## Jesus Christ

ciples. On the first day of the week, which is still celebrated as Palm Sunday, he made his triumphal entrance into Jerusalem. During the next two days he spent his time in Jerusalem, cleansing the Temple and delivering discourses in which he used a number of parables to teach the truths which he wished to establish, after which he retired to Bethany. On Wednesday he gave a warning of the betrayal, and on the following day he ate the last Passover with his disciples. After the Passover meal, having been betrayed by Judas, he was arrested in the Garden of Gethsemane, brought before the high priest Caiaphas, condemned by the Jewish sanhedrin and early on Friday morning sent before Pilate, the Roman governor of Jerusalem, in order that the sentence of death might be legally confirmed. By Pilate he was released to the Jews, by whom he was crucified on that day. After his death the body was taken from the cross and buried by Joseph of Arimathea and Nicodemus. The tomb in which the body of Jesus was laid was one belonging to Joseph, and was in a garden near the place of crucifixion. On the morning of the first day of the week, or the third day after his death, Mary Magdalen and other women with spices hurried to the tomb in order to complete the work of embalming the body, but they found the stone rolled away from the door of the tomb and the place where Jesus had lain occupied by an angel, who told them that Jesus had risen. See RESURRECTION; SABBATH.

After his resurrection Jesus remained on earth for forty days, during which time he appeared eleven times to his disciples and followers. At the last gathering on the Mount of Olives he ascended into heaven and was received by a cloud out of their sight.

Jesus reinforced his teaching by miracles and by parables. His miracles were evidently for the purpose of convincing the people of his divine origin and power. They were thirty-five in number and ranged in importance from the turning of water to wine to the raising of the dead to life. Most of them were connected with the healing of disease, and with few exceptions all of them were for the welfare of those upon whom or in whose favor they were wrought. The parables, thirty-three in number, contain the best illustrations of moral and religious truth to be found anywhere in literature. So broad is their application that the truths which they teach are accepted by the non-Christian as well as by the Christian world.



Of the many works treating of the life and teachings of Jesus Christ, the following are authentic and are the most satisfactory to the general reader: For young readers, *The Children's Life of Jesus*; for adult readers, Cunningham Geikie's *Life and Words of Christ*; Ederheim's *Life and Times of Jesus the Messiah*; S. H. Andrews's *Life of Our Lord upon the Earth*.

**Jet**, a variety of bituminous coal, which is very hard and takes a high polish. It is used for ornaments. It was called *Gagates* by the Romans, because it was first obtained near the mouth of the river Gagas in Syria.

**Jet'sam.** See FLOTSAM, JETSAM AND LIGAN.

**Jetty**, an artificial embankment, extending into the sea or some other body of water. Jetties are made of piles, mattresses of wood and stone and of stone alone. They may be constructed for piers or breakwaters, but in the United States the term is usually applied to embankments at the mouth of a river or harbor for the purpose of deepening the channel. The most noted illustration of this use of jetties is at the mouth of the Mississippi River. This river empties into the Gulf of Mexico by several channels and deposits annually a large quantity of silt, which made the channel so shallow as to prevent ocean-going vessels of large size from ascending the river. In 1874 Captain James B. Eads recommended the construction of jetties on the Southwest Pass as a means of deepening the channel, and the following year he was authorized to construct the jetties. The east jetty has a length of 11,800 feet, and the west, a length of 7800 feet. Rows of piles 1000 feet apart were first driven to mark the position of the dikes. The jetties are constructed of mattresses, made by binding together willows with planks and dowells. The willows were cut 15 feet long, and each mattress consisted of four layers, each crossing the one beneath it. The mattresses were 100 feet long; for the bottom course they were 50 feet wide, but were narrower for each succeeding course until those of the upper course had a width of 20 feet. The mattresses were sunk by piling stones upon them. As they filled with silt they continued to settle in the bed of the river until they were immovable. Within two years from the time of their completion a thirty-foot channel was secured, and it has been maintained ever since. Since their construction these jetties have been repaired and improved several times. See MISSISSIPPI RIVER.

**Jev'ons**, WILLIAM STANLEY (1835-1882), an English writer on logic and political economy,

born at Liverpool. He was educated at University College, London; held an appointment in the royal mint in Australia from 1854 to 1859; was appointed professor of logic, mental and moral philosophy and Cobden lecturer on political economy in Owens's College, Manchester, and later became professor of political economy in University College, London, a post which he resigned in 1881. Among his works are *Elementary Treatise on Logic*, *Theory of Political Economy*, *Principles of Science* and many essays and addresses on economic questions. Those entitled the *Coal Question*, the *Value of Gold and Money* and the *Mechanism of Exchange*, may be specially mentioned.

**Jew**, THE WANDERING. See WANDERING JEW, THE.

**Jewell**, MARSHALL (1825-1883), an American politician, born at Winchester, N. H. After receiving a common school education, he entered his father's tannery and belting factory at Hartford, Conn. He accumulated a fortune and later became prominent in Republican political circles. He was twice elected governor of Connecticut, was minister to Russia and postmaster-general under President Grant.

**Jew'elry**. The collective name applied to precious stones mounted for wear, and to small ornamental works in gold, silver, mixed metals, amber, coral and other materials. The use of personal ornaments dates from the earliest periods of which we have any knowledge, and it characterizes every part of the human race, whether civilized or savage. It is probable that the wearing of gold and silver ornaments immediately followed the discovery of those metals. Probably gold, from the form in which it is usually found and the beauty of its color, was the first to be used in this way, and also, from its ductility and capacity of receiving polish, it was the first to invite artistic skill in its working. Gold ornaments, displaying a high degree of skill in their manufacture, have been recovered from the ruins of Mycenae and Hissarlik, and from the tombs of ancient Egypt. The gold work of ancient Egypt, though executed nearly 3000 years ago, is of the highest quality, and in many points of excellence it would be impossible to surpass it by the most improved methods of modern times.

Many beautiful specimens of the work of the ancient Greek and Roman jewelers are preserved in the museums of Europe, and a large number of very interesting specimens have been obtained

from the tombs of Etruria. At the present day the Oriental jewelers preserve the same primitive methods of working that prevailed centuries ago. Their great manual dexterity and fine sense of color and beauty, however, enable them to obtain by simple means some very excellent results, and the work they produce, though unequal in finish to that of European workmen, is generally perfect in design and combination. New York is the chief center of the jewelry trade of the United States. In Europe the great centers for the production of jewelry are to be found in the cities of Paris, Vienna, London and Birmingham.

**Jew'ett**, SARAH ORNE (1849-1909), an American story writer, born in Berwick, Maine. Miss Jewett's work consisted principally of short stories of New England life, remarkably sympathetic and intimate. She dealt with aspects of life and character which are gentler and brighter than those portrayed by Mary E. Wilkins Freeman. *A Marsh Island* and *The Country Doctor* are novels.

**Jewfish**, the name given to two species of large fishes well known in American waters. The one, known also as the *guasa*, or *black grouper*, sometimes reaches the weight of seven hundred pounds. It has a large, flat head and huge mouth and is olive-green in color. This fish is common around Mexico, Florida and the West Indies. The other inhabits the California coast, often weighs five hundred pounds, is from five to seven feet long and has flesh of excellent quality.

**Jews**, the name given to the Hebrews after their return from their captivity in Babylon. They are a religious people, fond of home and their children, shrewd in money matters and intellectual. In form and feature they are short, with dark hair and eyes, a swarthy complexion, full lips and a characteristic nose.

The early history of the Jews is obtained from the Old Testament, which, in the *Pentateuch*, *Joshua*, *Judges*, *I* and *II Samuel* and *I* and *II Kings*, gives a history from the creation of the world to the destruction of Jerusalem by Nebuchadnezzar, in 586 B. C. The works of Josephus and the records of Egypt contribute also to the history. In 930 B. C. these people were divided, and they were known thereafter as the tribes of Israel, occupying the northern part of Palestine, and the tribes of Judah, occupying the southern part. Sargon, king of Assyria, took the northern tribes captive in 722 B. C. The kingdom of Judah paid tribute to the Assyrian government, but was not carried away captive till 586, when

Nebuchadnezzar besieged Jerusalem and took the inhabitants to Babylon; then independence of the Hebrew nation came to an end. Cyrus, after overthrowing the Babylonian kingdom, gave the Hebrews permission to return to Jerusalem and rebuild their Temple. The "Priestly Code" brought from Babylon by Ezra was adopted then, and the real Jewish history began.

After the time of Alexander the Great the Jews had to pay tribute to the Egyptians and to the Selucid rulers in Syria. Many went to Egypt, and under the advantages they enjoyed there they became well versed in science, art and statesmanship. The Greek translation of the Bible, the *Septuagint*, was produced at this time. Antiochus Epiphanes, about 170 B. C., forbade, in Jerusalem, Jewish sacrifices, circumcision and the observance of the Sabbath. Altars to idols were built in the small towns, and the people were compelled to observe Greek rites. Judas Maccabeus and his brothers Jonathan and Simon succeeded in gaining a victory over the Syrians in 169 B. C. This family continued in power till the capture of Jerusalem by Pompey, 63 B. C., but the last male representative, Antigonus, was put to death by Herod in 37 B. C. The Herodian line succeeded. In 6 A. D. both Judea and Syria came under Roman procurators. Claudius gave authority over Judea to Herod, who gained for the Jews Roman citizenship and other privileges. After Herod's death, the Roman governors came into conflict with the Jews, and this led to the destruction of Jerusalem by Titus in 70 A. D. and the banishment of the people. The final overthrow of this people was brought about by the capture of Bethar, the Jewish stronghold, 135 A. D. Many Jews in 70 A. D. went to Arabia, where they gained considerable power. Mohammed regarded them favorably till he found they would not accept his religion, when he began persecuting them. Many went to Syria and Mesopotamia. In Spain the Jews became famous for their learning and were allowed free worship in their religion and were nearly on terms of equality with the Moors. In the fourteenth century, they were compelled to be baptized and to accept the Christian religion. Those who objected were persecuted or even murdered. Under Ferdinand and Isabella, all who refused to become Christians were commanded to leave Spain, taking neither silver nor gold with them. Many hundred thousand left, to find almost every country hostile to them. Those who went to Portugal were compelled to leave in 1496 by order of King Emmanuel.



## Jews

Since 1837, the Jews have been allowed to return to Spain, but very few have taken advantage of the permission. In the eighth and ninth centuries, the Jews of France were well treated, but during the Crusades they were persecuted and many were massacred in a most horrible manner.

The first real settlement of Jews in England was made under William the Conqueror, who favored them. But when their wealth increased they became very unpopular, and in 1253 their condition became so unbearable that they asked leave to go from England. They were persuaded to remain, but in 1290, under Edward I, they were driven out. Many went to Germany and France, where they received the same treatment that had met them elsewhere. For three hundred years, no Jews were allowed in England. In 1655, Cromwell favored their admission, but they did not go till the time of Charles II. Since then, they have by degrees gained access to public offices, and in 1885 they were admitted to Parliament. In France, since 1790, Jews have had full rights of citizens, and in 1806, under Emperor Napoleon, they were allowed religious liberty. After alternating periods of freedom, persecution and banishment in Russia, the Jews since 1882 have been driven out of all professions and offices. More than 800,000 have left the country and settled in America and parts of Europe, yet they are more numerous in Russia than in any other part of the world. In Hungary, their position is equal to that of the Christians. In Holland they have never been subjected to persecution. Since 1867, a Jew in Austria may possess land.

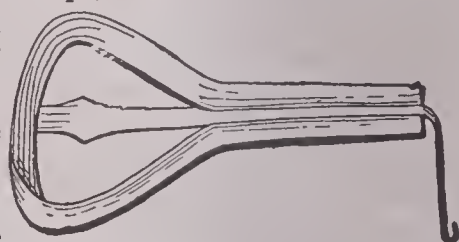
In 1654, Jews settled at Providence and Newport in the United States, since which time they have increased in numbers, hundreds of thousands coming from Russia, who have made for themselves homes in the large cities. A few Jews took part in the War of 1812 and the Mexican War, and many were on each side in the Rebellion. The total number of Jews in the world is estimated between seven and eleven millions. Over one million are in the United States. The Jews observe the seventh day, or Saturday, as their Sabbath, but commercial relations have led to their keeping their business houses open on Saturday, and in some places even Saturday worship has been entirely done away with. Schools for the training of men for the ministry have been in existence in Germany since the early part of the nineteenth century. In the United States is the Hebrew Union College at Cincinnati; the Jewish Theological Seminary,

## Jiu-Jitsu

established in New York in 1886; Gratz College, founded in Philadelphia in 1893. Baron de Hirsch has helped the founding of manual training and technical schools in New York, Philadelphia, Chicago and other cities.

**Jew's-harp**, a toy musical instrument. It is held between the lips, and the sound is produced by the motion of a tongue of steel, which is struck with the finger.

**Jeypore**, *ji por'*. See JAIPUR.



JEW'S HARP

**Jigger, Chigger or Chigoe** a very curious insect closely resembling the common flea but of minute size. In the United States the name is given to a minute scarlet insect, found in the grass and weeds of the Southern states. It attaches itself to the skin of man and burrows beneath it. Here its eggs are deposited, and troublesome itching sores result unless the insects are killed. Salt water will relieve the itching.



JIGGER

**Jimson Weed**. See STRAMONIUM.

**Jinrikisha**, *jin rik'e shah*, a light two-wheeled carriage, provided with a hood and drawn by a man. Near the outer end of the shafts is a crosspiece, which is used by the runner in pulling the carriage. By attaching cords to the crossbar, one or more out-runners can assist when more than ordinary speed is required or when the load is especially heavy. The puller is known as the *hiki*. He can go at a rapid pace and for long distances, frequently covering from thirty to forty miles in a day. The jinrikisha is in general use in Japan, India and some portions of China. Its invention is attributed to an American Baptist missionary, named Goble. The vehicle has also been used to some advantage in the army.

**Jiu-Jitsu**, a Japanese method of defence or offense without weapons. It has been popular in Japan for centuries, but until recently was taught only to privileged classes, who took oath not to reveal the system. At present it is taught in the schools, and soldiers, sailors and policemen are required to be expert in it. Recently it has become popular in Europe and America, for it is recognized as one of the best possible methods of physical training. It consists not in

## Joachim

a display of physical strength, but in the practice of certain twists, blows or clutches which will incapacitate an opponent, and it thus demands a knowledge of anatomy. The word itself means *muscle science*.

**Joachim**, *yo' a Keem*, JOSEPH (1831-1907), a famous Hungarian violinist. When twelve years of age he appeared in concert at Leipzig, attracting the attention of the musical world, but continued to study for several years. After 1849 he received several important appointments at court in Europe, and in 1869 he became head of the Royal School of Music at Berlin. His playing was characterized by remarkable sincerity and emotion and by wonderful purity of tone.

**Joan** *jo an'*, of Arc, THE MAID OF ORLEANS (1412-1431), was born in the village of Domremy, France, of peasant parents. While she was still a girl she was deeply affected by the woes of her country, much of which was in possession of the



JOAN OF ARC

From a statue by Chapu, in the Luxembourg, Paris.

English. In 1427 Orleans was being besieged by the English, and its fall would have ruined the cause of France. At this time Joan, who had been noted for her solitary meditations and pious enthusiasm, began, as she declared, to see visions and hear angelic voices, which finally

## Job

called upon her to take up arms for Charles, to raise the siege of Orleans and to conduct Charles to Rheims to be crowned. At first she was regarded as insane, but eventually she found her way to the king and his councilors, and having persuaded them of her sincerity, received permission to hasten to the deliverance of Orleans. In male dress, fully armed, she bore the sword and the sacred banner, as the signal of victory, at the head of the army. The first enterprise was successful. In April, 1429, she entered Orleans with supplies, and by the bold sallies to which she animated the besieged, the English were forced from their entrenchments and compelled to abandon the siege. Other successes followed; Charles entered Rheims in triumph, and at his anointing and coronation Joan stood at his side. She was wounded in the attack on Paris, where Bedford repulsed the French troops, but continued to take part in the war till May, 1430, when she was taken prisoner by the Burgundians and sold to the English. She was taken to Rouen, and after a long trial, accompanied with many shameful circumstances, she was condemned to death as a sorceress by the ecclesiastical tribunal. On submitting to the Church, however, and declaring her revelations to be the work of Satan, her punishment was commuted to perpetual imprisonment. But pretexts were soon found to treat her as a relapsed criminal, and as such she was burned at Rouen, May 30, 1431. She died with unshaken courage.

**Job**, *jobe*, the hero of an ancient Hebrew poem, which forms one of the books of the Old Testament. Job, an upright man with a family of seven sons and three daughters, with large herds and numerous servants, is suddenly, with the permission of Jehovah and by the agency of Satan, deprived of his possessions and his children and smitten with a sore disease, yet he submits patiently to the divine will. Three friends come to console him, and a large part of the poem is occupied with the speeches of his friends, who attribute his misfortunes to wickedness and hypocrisy, and with his replies to them. Near the close, God himself is introduced answering Job out of a whirlwind. In the sequel Job is delivered from his calamities, lives 140 years, becomes richer than he had been before and begets seven sons and three daughters. The design of the book seems to be to enlarge men's views of the providence of God. The basis of the story was probably traditional, and it is not known at what time the book of *Job* was written.



**Jo'el**, one of the twelve minor prophets. Nothing is known of his life. He is generally supposed to have been contemporaneous with Hosea and Amos.

**Joffre**, *jof fra*, JOSEPH JACQUES CÉSAIRE (1852- ), a French military commander and mathematician, born in Rivesaltes. He served in the artillery during the Franco-Prussian War and became captain in 1874. He took part in campaigns in Tongking, Dahomey, Madagascar and Timbaktu. In 1911 he was appointed chief of the General Staff. In 1914 he was made commander-in-chief of all the French forces. See WAR OF THE NATIONS.

**Johannesburg**, *yo hahn'nes burg*, a city in the Transvaal, situated 30 miles south by west of Pretoria and connected by railway with Cape Town, Port Elizabeth, Durban and Delagoa Bay. It is a modern town in every respect, with broad, well-planned streets, electric lights, telegraph and telephone lines and street cars. The chief public buildings are the courthouse, the public library, the stock exchange, and a number of theaters. Population in 1896, 48,330; in 1911, 237,104, of whom 119,253 were whites. The city was captured by the British troops in May, 1900.

**John**, called *the Baptist*, the forerunner of Christ, was born six months before Jesus (their mothers were cousins), of a Levitical family in Judea. He lived a life given up to solitary meditations till A. D. 26, when he began to preach in the deserts of Judea, announcing that the kingdom of heaven was at hand and proclaiming himself the harbinger of the Messiah. John baptized many converts and testified to the higher mission of Jesus at the time of Christ's baptism in the Jordan. To gratify a vindictive woman, Herod Antipas, tetrarch of Galilee, caused him to be beheaded in prison.

**John**, the name of twenty-three popes of Rome, from 523 A. D. to 1419, among whom are the following: JOHN I (*Saint John*), pope from 523 to 526, was sent to Constantinople by Theodoric to induce the emperor Justin to adopt milder measures toward the Arians, and on his returning without success Theodoric threw him into prison, where he died. JOHN XII (*Octavianus*), pope from 955 to 964, gained the support of Otho, and in his gratitude crowned Otho emperor of Germany. He presently conspired against the emperor, who threatened to depose him. John XII introduced the custom of the pope's assuming a new name on his accession. JOHN XIX, pope from 1022 to 1029, crowned Conrad II in the presence of Canute, the Danish king of England.

JOHN XXII, pope from 1316 to 1334, possessed extraordinary abilities, was a patron of learning, wrote some medical treatises and was a zealous worker for the propagation of the faith in distant lands. He lived a simple, student's life himself, but collected vast sums of money for the Church. JOHN XXIII, pope from 1410 to 1415, was a Neapolitan. While cardinal, he was prominent in the Council of Pisa. As pope he called the Council of Constance, by which he was, however, deposed. After four years' imprisonment he was released and made dean of the Sacred College.

**John** (about 1167-1216), king of England, the youngest son of Henry II. As he was left without any particular provision, he was given the name of Lackland; but his brother, Richard I, on his accession conferred large possessions on John. John obtained the crown on the death of Richard in 1199, although the French provinces of Anjou, Touraine and Maine declared for his nephew, Arthur of Brittany, who was lineally the rightful heir. A war ensued, in which John recovered the revolted provinces. In 1205 began his great quarrel with the pope, regarding the election to the see of Canterbury, to which the pope had nominated Stephen Langton. The result was that Innocent III laid the whole kingdom under an interdict and in 1211 issued a bull deposing John. Philip of France was commissioned to execute the decree and was already preparing an expedition when John made abject submission, even agreeing to hold his kingdom as a vassal of the pope (1213). John's arbitrary proceedings led to a rising of his nobles, and he was compelled to sign the Magna Charta, or Great Charter, June 15, 1215. But John did not mean to keep the agreement, and obtaining a bull from the pope annulling the charter, he raised an army of mercenaries and commenced war. The barons, in despair, offered the crown of England to the dauphin Louis, who accordingly landed in England in 1216 and was received as lawful sovereign. The issue was still doubtful when John was taken ill and died.

**John II**, called *the Good* (1319-1364), king of France, succeeded to the crown in 1350. In 1356 he was defeated and taken prisoner by the Black Prince at the Battle of Poitiers, and he was detained at Bordeaux and at London till released at a heavy expense to his country by the Peace of Brétigny in 1360. On learning that his son, the duke of Anjou, who had been left as a hostage in England, had escaped, John returned to London, where he died.



JOSEPH JACQUES CESAIRE JOFFRE  
Field Marshal of France





**John III Sobieski** (1624–1696), king of Poland, son of a Polish captain. He served in the French army, returned to Poland to assist in repelling the Russians in 1648 and greatly distinguished himself in several campaigns, winning in 1667 the rank of commander in chief of the Polish army. On the death of the Polish king, in 1673, John was chosen his successor. His most celebrated achievement was the relief of Vienna, which was besieged by a great army of Turks, whom he decisively defeated in 1683.

**John, KNIGHTS OF SAINT, or Knights Hospitalers of Saint John**, afterward called *Knights of Rhodes* and finally *Knights of Malta*, were a celebrated military religious order, originating in a monastery founded at Jerusalem in 1048 by some merchants from Amalfi. The monastery was dedicated to Saint John the Baptist, and the monks, who were called Brothers of Saint John, or Hospitalers, cared for the poor and sick and assisted pilgrims. An order was founded in America in 1889.

**John, SAINT**, one of the apostles, often distinguished as *Saint John the Evangelist*, the reputed author of the fourth Gospel, three epistles and the Revelation, was the son of Zebedee and Salome and the brother of James. Previous to his call by Jesus he was a fisherman on the Sea of Galilee. His Gospel was written later than any of the others—according to some critics, to refute particular heresies—and contains fuller details of our Lord's conversation and discourses than the other Gospels and is also more doctrinal in character. Of the three epistles, the first has much resemblance to the Gospel; but the other two were considered doubtful even by the early fathers. After the death of Jesus, John continued at Jerusalem, and later he was at Samaria (*Acts* VIII, 14–25). Tradition handed down by the fathers declares that he died at Ephesus, and if he wrote the Revelation he must have been banished to Patmos. The time of his death is unknown.

**John Bull.** See BULL, JOHN.

**John Dory**, the common English name for a peculiar food fish found in the Mediterranean and elsewhere. It is less than twenty inches in length and has an enormous mouth. It is a voracious animal, though inert when not looking for food. A round black spot, which marks the middle of its side, has been the subject of many legends. By one it is said that these marks were left by the thumb and finger of Saint Peter when he took the tribute money from the fish's mouth.

Other species of the same genus are given the same name.

**John of Gaunt, DUKE OF LANCASTER** (1346–1399), fourth son of Edward III of England. He was created duke of Lancaster in 1362, served in the French wars and became governor of Guienne. On the death of his father-in-law, king of Castile, he assumed in right of his wife the title of king of Castile and invaded the kingdom to assert his claims, but subsequently relinquished them in favor of Henry of Castile, Pedro's successor, who became John's son-in-law. John's eldest son became king of England as Henry IV.

**Johns Hopkins University**, an institution of higher learning at Baltimore, founded by Johns Hopkins in 1867. His gift of \$7,000,000 provided for the establishment of a university and a hospital. The university has an endowment of \$5,269,000, a library containing 165,000 volumes, a faculty of 200 and an attendance of nearly 900 students. It has two departments, the philosophical department and the medical school, in each of which instruction is offered to both undergraduates and graduate students. The advantages offered for postgraduate work are especially attractive, and the university annually awards a large number of scholarships and fellowships to American students desiring to do research work in literature, science or medicine. The Maryland geological survey and weather bureau are closely connected with the university. Some of the most authentic works in the country on literature, history and scientific subjects are issued at frequent intervals by the departments under the title of *Studies*.

**John'son, ANDREW** (1808–1875), an American statesman, seventeenth president of the United States, born at Raleigh, N. C. Owing to the death of his father and the poverty in which the family was placed, Johnson received but little schooling. However, he educated himself by constant reading and by the aid of his wife. In 1826 he removed to Greenville in East Tennessee and took a prominent part in the politics of his locality and of the state, being elected to the state legislature several times. In 1842 he was chosen to Congress, and he was four times reëlected. He supported the annexation of Texas, the Mexican War and the compromise measures of 1850. In 1853 Johnson was chosen governor of Tennessee, and four years later he entered the United States Senate, where he attracted attention as spokesman of the radical



## Johnson

Union party. Returning to his state in 1861, he continued to labor for the Union cause and in the following spring was made military governor of Tennessee.

In 1864 he was nominated for vice-president on the Republican ticket and became president upon the assassination of Lincoln in the following April. Though at first a radical exponent of congressional reconstruction and favoring the severest measures toward the seceded states, he soon came under the influence of Secretary Seward and adopted a conciliatory



ANDREW JOHNSON

policy. He proclaimed general amnesty and ordered the establishment of provincial congresses in several states; but soon he was met by radical opposition on the part of Congress. The contest between the president and Congress continued with the greatest bitterness, President Johnson vetoing all the important reconstruction measures and Congress immediately passing them over his veto with insulting resolutions. The crisis in the struggle came when Johnson requested the resignation of Edward M. Stanton, secretary of war, who had opposed the president's policy. The Senate refused to ratify this removal, and the president refused to recede from his position. The result was an impeachment trial, the principal charges being violation of law in the removal of the

## Johnson

secretary, and insulting statements in the president's public speeches against Congress. After a long trial, presided over by Chief Justice Chase, the president was acquitted, the prosecution lacking one vote of the two-thirds necessary for conviction.

Though the Democrats had favored Johnson's policy, he had forfeited claims to leadership by deserting the party at the opening of the war, and he was not renominated, being succeeded by General Grant. Johnson's last official act was to proclaim pardon to all who had been concerned in secession. He immediately began a campaign for the Senate and was elected in 1875, but died in July of the same year. See RECONSTRUCTION; IMPEACHMENT.

**Johnson, EASTMAN** (1824-1906), an American artist, born at Lovell, Maine. From his boyhood he devoted himself to art. In 1849 he went abroad to study and, after visiting the principal European galleries, established himself in Paris. In 1858 he settled at New York and was in 1860 elected to the National Academy. Among his works are *The School of Philosophy at Nantucket*, *The Old Kentucky Home*, *Old Stage Coach*, *Husking Bee* and *Milton Dictating to His Daughters*.

**Johnson, HERSCHEL VESPASIAN** (1812-1880), an American politician and jurist, born in Burke County, Ga. He was educated at the University of Georgia, studied law, began practice at Atlanta and settled at Milledgeville, the capital, in 1844. He was appointed to the United States Senate by the governor, in 1848, where, at first a strong states' rights man, he soon became a loyal unionist. From 1849 to 1853 he was judge of the superior court of his state and for the following four years was governor. At the split in the Democratic party in 1860 he was nominated by the Northern Democrats for vice-president, and though defeated, he did his utmost to avoid secession; but he followed his state and was elected to the second Confederate senate. In January, 1866, he was elected to the United States Senate, but was refused admission. In 1873 he became judge of the superior court.

**Johnson, JOHN A.** (1861-1909), an American journalist and politician, born at Saint Peter, Minn. At the age of twelve he found employment in a printing office. Later he became editor of the *Saint Peter Herald*. He served one term in the state senate. In 1904 was elected governor of Minnesota and re-elected in 1907. His successful administra-

tion made him a prominent candidate for the Democratic nomination for president in 1908.

**Johnson, JOHN**, Sir (1742-1830), an American Tory leader, the son of Sir William Johnson, born on the latter's estate in New York State. He took part in the French and Indian War, and at the opening of the Revolutionary War he succeeded in inducing the Iroquois Indians under Joseph Brant, his father's protégé, to join the English. He also organized a Tory regiment, known as the "Queen's Own American Regiment," or the "Royal Greens." He was with Saint Leger in his campaign of the summer of 1777, and for two years he was an influential promoter of the Indian-Tory raids, including the Wyoming Valley and Cherry Valley massacres. He was defeated by Sullivan's army in 1779 and retired to Montreal. His New York estates were confiscated at the end of the war.

**Johnson, REVERDY** (1796-1876), an American statesman, born in Annapolis, Md., educated at Saint John's College and admitted to the bar in 1815. In 1817 he went to Baltimore, was elected to the state senate in 1821 and to the United States Senate in 1845, resigning his seat to become attorney-general in President Taylor's cabinet. He was again elected senator in 1863. In 1868 he was appointed minister to England, but was recalled in the following year, and thereafter he resumed his law practice, being connected with many famous cases.

**Johnson, RICHARD MENTOR** (1780-1850), an American statesman, vice-president of the United States, born in Kentucky. He was educated at Transylvania University, was admitted to the bar, became a member of the state legislature and in 1806 was elected to Congress, serving with slight interruption till 1819. He fought with great bravery in the war with Great Britain in 1812-1813 and, it is said, fired the shot which killed Tecumseh, at the Battle of the Thames. He was a member of the Senate from 1819 to 1829 and of the House of Representatives again until 1837, when he was elected vice-president on the ticket with Van Buren. He was a strong supporter of Jackson. Johnson was again nominee for vice-president in 1840, but was defeated and was an unsuccessful aspirant for the presidential nomination in 1844.

**Johnson, ROSSITER** (1840- ), an American journalist and author, born at Rochester, N. Y. He was educated at the University of Rochester and after graduation entered jour-

nalism in Rochester and Concord, N. H. He held responsible positions on the staff of the *American Encyclopedia*, *The Annual Cyclopaedia*, *Encyclopedia of American Biography* and *The Standard Dictionary*. He also assisted in the compilation of numerous sets of literary masterpieces, including the *British Poets*, *Fifty Perfect Poems* and the *Little Classics* series. He was the author of unimportant works of fiction, some verse and numerous histories and biographies, of which the most important was probably a *History of the War of Secession*.

**Johnson, SAMUEL** (1709-1784), an eminent English author, son of a bookseller, was born at Lichfield. The most important part of his education was the wide reading in which he indulged in his father's shop. In 1728 he entered Pembroke College, Oxford, but was obliged by poverty to retire after three years, without taking a degree. For thirty years from this time he was engaged in a constant struggle with poverty. He served for a time as an usher in a school, but he was not fitted for this work and finally gave it up, turning to writing as a means of support. In 1735 he married the widow of a mercer, considerably older than himself, to whom he was sincerely attached. Up to the time of her death he remained devoted to her, and as she seems to have recognized his worth, the marriage was not unhappy. A school which Johnson started with the money his wife brought him soon failed; and in 1737, removing to London, he entered on his long course of literary toil. His reputation rose very slowly; the greater part of his time for many years was wasted on desultory and occasional efforts. A large proportion of his writings appeared in the *Gentleman's Magazine* or in pamphlets; and most of these are quite forgotten. His poverty was at times almost unendurable, and it is not strange that Johnson, always melancholy, grew more and more pessimistic, and that he expressed his pessimism in such poems as *London* and the *Vanity of Human Wishes*. When *Irene*, a tragedy which Johnson had written before coming to London, was brought out, he received some relief from his poverty.

From 1750 to 1752, and again in 1758, Johnson conducted periodicals modeled on the plan of *The Spectator*, but these, *The Rambler* and *The Idler*, with their essays in Johnson's formal, heavy style, were never popular. Meanwhile, from 1747, Johnson's attention was chiefly engaged by his *Dictionary of the English Lan-*



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*guage*, a work which appeared in 1755. The dictionary, though it raised his fame, added little to his worldly means; and when in 1759 his mother died, Johnson, to provide money for the funeral, wrote in one week the philosophical novel, *Rasselas*. In this poverty he lived until 1762, when he obtained from the government a pension of £300 a year. He was thenceforth in easy circumstances and could enjoy without restraint the society of Burke, Reynolds, Gibbon, Garriek, Goldsmith and others in the famous club which became so formidable a power in the world of letters. Although Johnson was uncouth in his manners and slovenly in his dress, he was looked up to by these men, and in fact he easily dominated the club. In 1763 his first interview took place with his famous biographer, James Boswell. In 1765 his intimacy with the family of Mr. Thrale began, a wealthy brewer, and in the same year his long promised edition of Shakespeare appeared. A tour to the Hebrides made in 1773, in company with his friend Boswell, was described in his *Journey to the Western Isles*, and his last literary undertaking was his *Lives of the Poets*, which was completed in 1781. He was buried in Westminster Abbey. Boswell's *Life of Johnson* gives us a better idea of the man than we can gain from his own works, because, eminent as he was in his day as a writer, he was still more revered and influential as a conversationalist, and many of his conversations Boswell has reported.

**Johnson, THOMAS** (1732-1819), an American statesman, born in Maryland. He studied law and soon entered politics, becoming an ardent patriot. He was chosen to the Continental Congress, where he moved the appointment of General Washington as commander in chief, and for a time he was at the head of the Maryland militia in the Revolutionary War. He served at different times as member of the provincial congress of Maryland, of the house of delegates and as governor, was an earnest advocate of the Articles of Confederation and in the Maryland convention vigorously supported the Federal Constitution. He was chosen one of the first justices of the United States Supreme Court, but declined the position of chief justice and also the office of secretary of state. He was a member of the commission that laid out the city of Washington, D. C.

**Johnson, WILLIAM, Sir** (1715-1774), a British-American soldier, born in County Meath, Ireland. In 1738 he came to New York to

## Johnston

manage the estates of his uncle. He soon entered into close and friendly relations with the Indians through his honesty in dealings with them, and was appointed to important offices by the governor of New York. On the outbreak of the French and Indian War, he was placed in full charge of the Indians in New York, and commanded the expedition against Crown Point. He won an important victory at Lake George, for which he received £5,000 from Parliament and a baronetcy from the king. Through his influence the Iroquois Confederacy remained neutral and later took no part in the conspiracy of Pontiac, this service being rewarded by the gift of nearly 100,000 acres of land in the fertile Mohawk Valley. Here he built the mansion called Johnson's Hall, which became the nucleus of the city of Johnstown, N.Y.

**John'ston, ALBERT SIDNEY** (1803-1862), an American soldier, born at Washington, Ky. He



ALBERT SIDNEY JOHNSTON

graduated at West Point, entered the army and fought in the Black Hawk War, but resigned in 1834 and went to Texas. He fought with the Texans in their war for independence, became commander of the Texan army and in 1838 was secretary of war of the new Republic. Resigning in 1840, he became a planter. At the outbreak of the Mexican War, he again entered the service of Texas, and at its close he became an officer in the United States army. In 1857 he won distinction in command of an expedition against the Mormons, exhibiting remarkable discretion and courage, both on the

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march and in his negotiations with the Mormon leaders. He was brevetted a brigadier general, but at the opening of the Civil War resigned his commission and entered the Confederate army, being placed in command of the forces in the west. During the winter of 1861 he exhibited marked ability in the defense of Kentucky and Tennessee, and at Shiloh, in April, 1862, he won a brilliant, but temporary, victory, being killed while leading a charge at the crucial point of the battle. He won the esteem of military critics on both sides for his management of large forces and his courage in battle.

**Johnston, ALEXANDER** (1849-1889), an American historian, born in Brooklyn, N. Y. He was for several years professor of political economy at Princeton University, but is best known by his *History of American Politics*, a concise and useful manual; *History of the United States for Schools*, and *History of Connecticut*. He also edited *Representative American Orations*, contributed the article on the history of the United States to the *Encyclopedia Britannica* and assisted in the editing of Lalor's *Cyclopedia of Political Science*.

**Johnston, JOSEPH EGGLESTON** (1807-1891), an American general, born in Prince Edward County, Va. He graduated at West Point in 1829 in the same class with Robert E. Lee, took part in the Black Hawk War and in the Seminole War, but resigned in 1837, becoming a civil engineer. In the following year he entered the engineering service of the army and in 1846 became captain. He served with distinction in the Mexican War and was severely wounded at the Battle of Cerro Gordo, being brevetted major and colonel for his conduct there and lieutenant colonel for his gallantry at Chapultepec. In June, 1860, he became quartermaster general of the army, with the rank of brigadier general, but in the following spring he resigned and became brigadier general in the Confederate army and later full general.

He took part at the first Battle of Bull Run and for a time had full command of the Confederates in Virginia, but was wounded at Fair Oaks, being succeeded by Robert E. Lee. Later he became commander of the military Department of Tennessee, but was defeated by Grant at Jackson, while attempting to relieve Vicksburg. After the battles of Chattanooga, he became commander of all the Confederate forces in the southwest and conducted a brilliant retreat before General Sherman from Chatta-

## Johnstown

nooga to the vicinity of Atlanta, winning a great victory at Kenesaw Mountain. He was superseded, however, by General Hood and was given an important command only at the insistent request of General Lee, who appointed him to resist Sherman's advance northward from Savannah. He was several times defeated, however, and surrendered April 26, 1865. After the war he engaged in business in the South, was elected to Congress from Virginia in 1876 and was appointed United States commissioner of railroads in 1885. Military critics agree in considering General Johnston one of the greatest commanders in the Civil War.

**Johnston, MARY** (1870- ), an American novelist, born at Buchanan, Botetourt co., Va. She received a private education and first came to public notice by her novel, *Prisoners of Hope*, a story of colonial days in Virginia. A second romance with much the same setting, *To Have and to Hold*, appeared in 1899 and met with great success. A third, *Audrey*, with the same theme, also was well received. The last two were dramatized and created a favorable impression. Her later novels include *The Long Roll*, a Civil War story, and *Hagar*.

**Johns'town, N. Y.**, the county-seat of Fulton co., 45 mi. n. w. of Albany, on the Cayadutta Creek and on the Fonda, Johnstown & Gloversville railway. The industries of the city are almost exclusively devoted to the production of gloves and mittens. In Johnstown and the neighboring city of Gloversville, there are 150 factories, which supply more than half of all the gloves that are used in the United States. The place was settled in 1760 and was named after Sir William Johnson, whose mansion, erected in 1761, is still standing. The courthouse and jail are also of historical interest, for both were built in 1772. Population in 1910, 10,447.

**Johnstown, PA.**, a city in Cambria co., 76 mi. e. of Pittsburg, on the Conemaugh River, and on the Pennsylvania railroad and a branch of the Baltimore & Ohio. It is situated in an irregular and narrow valley at an elevation of about 1200 feet. The city became especially well known by the flood of 1889. Heavy rains had so swollen the streams that the dam across the south fork of the river, 12 miles east of the city, but 18 miles along the river, gave way and released the water in Conemaugh Lake. Johnstown and the neighboring villages in the valley were very soon submerged in a roaring torrent of water, and about \$10,000,000 worth of property



## Johore

was destroyed, with a loss of at least 2235 lives. Aid was contributed by other cities, and the place was at once rebuilt. There are deposits of bituminous coal in the vicinity, and the city has extensive iron and steel works, coke ovens, tanneries, brickyards, manufactures of fire-clay products and other works. Important features of interest are the public parks, Grand View cemetery, Conemaugh Valley Memorial Hospital, Cambria Free Library, the high school building and the city hall. Johnstown was settled about 1790, but it was not incorporated until 1889. Population in 1910, 55,482.

**Johore**, *jo hor'*, an independent state at the southern extremity of the Malay Peninsula, with an area of about 9000 square miles. The country is densely covered with timber and rises into several mountain peaks, the highest being Mount Ophir, 4186 feet. The chief products of the country are gambier and black pepper. All kinds of fruit are plentiful. The climate is tropical but healthful. The capital is Johore, a small town 15 miles northeast of Singapore. Great Britain, by a treaty in 1885, was given control of the foreign affairs of Johore. Population, estimated at 200,000.

**Joints**, in anatomy, the joining of the bones. They may be classified as movable and immovable. (1) The ball and socket joints, found at the shoulders and the hips, admit great freedom of motion. In the ball and socket joint the rounded head of a long bone fits into a cavity made by other bones and is held in place by a loose sac, called a *capsular ligament*, and by surrounding muscles. In the hip the articulation is still further strengthened by a ligament attached to the head of the thigh bone and to the cavity. At the shoulder, the socket is not as deep as at the hip, hence there is much greater freedom of motion. (2) Hinge joints, which admit of motion in two directions, that is, can be bent and straightened, are found in the knee, the fingers, the toes and, in a modified form, between the lower jaw and the cranium. In this joint the bones articulate by ridges that fit into grooves. (3) Pivot joints, in which one bone rotates on another, as the first cervical vertebra on the second. The power to turn the hand over without moving the shoulder is due to a modified pivot joint at the elbow where the radius rotates on the humerus and over the ulna. (4) Gliding joints, which admit of but little movement, are found in the wrist and ankle. There are also slight movements between the vertebrae. Immovable joints are found

## Joint Stock Company

between the bones of the cranium and face. In movable joints the ends of the bones are covered with a smooth cartilage, which is kept moist by a secretion, called synovia, from a very thin membrane which surrounds the joints. This secretion serves the same purpose that oil does in a machine. Any dislocation in a joint should receive immediate attention, as swelling so soon follows as to make it difficult to replace the bones or, as physicians say, to reduce the dislocation. If medical aid is not at hand the joint should be kept in hot bandages. The same action should be taken in case of a *sprain*, an injury that if neglected may give permanent trouble. See **LIGAMENT**; **TENDON**.

**Joints**, in geology, the cracks or fissures which divide rocks into more or less regular blocks. They occur generally in systems, the joints being parallel and plane, those which run



JOINTS

parallel to the strike being called strike joints, those parallel to the dip, dip joints, and others, diagonal joints. The causes of joints are (See **DIP**) earthquakes and the contraction of rocks upon cooling or drying.

**Joint Stock Company**, a species of partnership in which a number of persons contribute funds, or *stock*, for the purpose of carrying on a trade or other profitable object. The management is vested in certain officers, usually president, vice-president, secretary and treasurer, and sometimes others, chosen by and under the direction of a board of directors chosen by the stockholders. The general body of shareholders takes no active part in the concerns of the company, beyond exercising a control over the acts of the directors on special occasions. The capital is generally divided into equal shares, each member holding one or more and, in proportion to this number, participating in the profits. No member can demand payment of his share from the company, but he may, without consent of his fellow members, transfer his share to another person. In nearly all the states these joint stock companies are now by

## Joinville

statute invested with some of the privileges of a corporation. Five or more persons, by subscribing their names to articles of association and filing these with the proper state officer, may form an incorporated company. It may be in one of three forms: (1) as a company limited by shares, where the liability of each member is limited to the amount unpaid on the shares which he has agreed to purchase; (2) as a company limited by guarantee, where the liability of each member is limited to such amount as he undertakes in the memorandum of association to contribute to the assets of the company if it should go out of business; (3) an unlimited company, where there is no limit to the liability of the members. In the first two cases the word "limited" must be added to the name of the company, and the amount of capital, object, place of business and declaration of the limit or the amount of guarantee must be entered in the memorandum of association, which must be accompanied by articles of association providing for the management of the company. See PARTNERSHIP; CORPORATION.

**Join'ville**, JEAN, Sire de (1225-1317), a French chronicler. He early entered the service of Thibaut of Champagne, and in 1248 he raised a troop of knights and soldiers and accompanied Louis IX in his first crusade to the Holy Land. He rose high in favor with Louis, shared his captivity, returned with him to France in 1254 and spent much of his time at court. His *Histoire de Saint Louis*, which is one of the most valuable literary productions of the Middle Ages, has been often reprinted.

**Jokai**, *yo'kah e*, MAURUS (1825-1904), a famous Hungarian novelist. He produced his first novel, *Working Days*, in 1846, and it became immediately popular. He was prominent during the Revolution of 1848, and after it had been put down he was imprisoned. The entire revolutionary period and his own imprisonment and escape furnished the scene and plot for many later novels. Among Jokai's most important works are the novels, *The Two-Horned Man*, *The Hungarian Nabob*, *The Carpathian Sultan*, *The New Landlord* and *Black Diamonds*; the dramas, *King Koloman*, *The Martyrs of Szigetvar* and *Milton*, and a *History of Hungary*.

**Jo'liba**. See NIGER.

**Jo'liet**, ILL., the county-seat of Will co., 40 mi. s. w. of Chicago, on the Desplaines River, on the Illinois & Michigan Canal and on the Chicago & Alton, the Chicago, Rock Island & Pacific, the Atchison, Topeka & Santa Fé, the

## Jones

Elgin, Joliet & Eastern and other railroads. A state penitentiary is located here, and the city has a public library, two hospitals, the Saint Francis and the Saint Mary academies, a township high school, a Masonic temple and a clubhouse for working men, built by the Illinois Steel Company. The industrial establishments are large steel, wire and tin plate works, stove factories, machine shops, implement works and other factories. A number of large limestone quarries are found in the vicinity. Joliet was settled about 1831 and was incorporated as a city in 1852. Population in 1910, 34,670.

**Joliet**, *zho lyay'*, LOUIS (1645-1700), a Canadian explorer, born in Quebec and educated for the priesthood. He was fond of adventure, however, and made several expeditions to the head of the Great Lakes. In 1672, with a Jesuit priest, Jacques Marquette, he was given command of an enterprise, the object of which was to trace the course of the Mississippi River. By his explorations it became certain that the Mississippi flowed into the Gulf of Mexico.

**Jommelli**, *yo mel'le*, NICOLO (1714-1774), a famous Italian musical composer, born near Naples and educated in that city. In 1754 he became *kapellmeister* to the duke of Württemberg; during his residence there the German ideals of musical composition greatly modified his natural Italian temperament, and upon his return to Naples he was coldly received. This doubtless hastened his death. His best operas, of which he wrote forty, were *Merope*, *Armida* and *Ifigenia in Aulide*. Among the other compositions, the oratorio *La Passione* and his *Miserere* are considered his masterpieces.

**Jo'nah** (dove), one of the minor prophets, son of Amittai, and according to *II Kings* xiv, 25, a contemporary of Jeroboam II, was born at Gath-Hepher, in Galilee. The book which bears his name is historical, rather than prophetic, and the miraculous event of Jonah remaining three days and three nights in the belly of the fish has been regarded by some as an allegory, a parable or a myth. Some theologians, however, are of the opinion that the mention of it by Christ (*Matt.* xii, 40) obliges us to regard the event as really historical. Jonah's grave is shown at Mosul, the ancient Nineveh, and also at Gath.

**Jones**, JOHN PAUL (1747-1792), a famous commander in the American naval service during the Revolution was born in Kirkcud-



## Jones

brightshire, Scotland. In 1773 he emigrated to Virginia, and about that time he added to his real name, John Paul, the name of Jones,



JOHN PAUL JONES

for what reason is not known. On the outbreak of the Revolutionary War he offered his services to the United States, and in 1775 he was given command of the flagship *Alfred*. For his excellent service on that vessel he was given in the following year the chief command of the *Providence*, and on this vessel he made several successful cruises, capturing a large number of prizes. With the *Alfred*, to which he was afterward returned, he also made many important captures. His removal from the *Alfred* was felt by Jones to be a great injustice and increased the resentment which he had hitherto felt against Congress because he was placed in rank below a number of naval captains who had not known as long and efficient service. In 1777, while in command of the *Ranger*, he set out on a European cruise, sailed along the coasts of England and by this daring invasion of British waters aroused great fear in the coast towns. In 1779, in command of the *Bon Homme Richard*, he threatened Leith and captured the British sloop-of-war *Serapis*, after a bloody engagement off Flamborough Head. This was his greatest achievement, and high honors were shown him. On his return to America, however, he was somewhat neglected by Congress, and in 1788 he entered the Russian service with

## Jonson

the rank of rear admiral. Owing to the jealousy of Russian commanders, he soon retired from the service and went to Paris, where he died. In 1905 a search was instituted for his remains, which were at length discovered, brought to the United States and buried at Annapolis, Md.

**Jones, SAMUEL PORTER** (1847–1906), an American clergyman and evangelist, was born in Chambers County, Ala. He became a clergyman in the Methodist Episcopal Church South. After filling several pastorates he spent a portion of his time in evangelistic work. He acquired a wide reputation, and many of his sermons and lectures were noted for their lack of conventionality. His works include *Sermons and Sayings by Sam Jones* and *Quit Your Meanness*.

**Jonesboro, ARK.**, the county-seat of Craighead co., 67 mi. n. w. of Memphis, Tenn., and on the Saint Louis Southwestern and other railroads. It is an important lumber center and has large heading and box factories. Population in 1910, 7123.

**Jon'quil**, a bulbous plant, a species of narcissus, allied to the daffodil. It has long, lily-like leaves and spikes of yellow or white fragrant flowers. Perfumed waters are obtained from jonquil flowers. (See illustration on next page.)

**Jon'son, BEN or BENJAMIN** (1573?–1637), a celebrated English dramatist, the contemporary and friend of Shakespeare. He was born at Westminster and was placed in the



BEN JONSON

Westminster or Grammar School at an early age, but was withdrawn, it is said, by his step-father, a master bricklayer, who wanted his assistance

## Jonson

in the business. He soon tired of this occupation, entered the army as a private soldier and showed much personal courage during a campaign in Holland. Returning to England, he began his career as an actor, and in 1598 his drama, *Every Man in His Humor*, was produced, Shakespeare playing a part in it. A duel, in which he killed his antagonist, led to Jonson's imprisonment, and after his release he was deprived of his possessions and branded on the thumb. In 1599 he brought out his comedy, *Every Man Out of His Humor*, which



JONQUILS

was followed by *Cynthia's Revels*; *The Poetaster*; *Sejanus*, a tragedy; *Volpone*; *Epicoene, or the Silent Woman*, his best work, and *Catiline*, a tragedy. In 1619, on the death of the poet laureate, Jonson was appointed his successor, and the salary was raised to the sum of \$500 by Charles I. Much of his time was spent at the Apollo, Mermaid and other taverns, feasting, drinking and engaging in those brilliant contests of wit in which in earlier days Shakespeare also had taken part. His latter days were spent, not perhaps in much prosperity, but certainly in fame and honor, as the acknowledged chief of English literature. He died of an attack of palsy, leaving behind him an unfinished pastoral poem of great beauty, *The Sad Shepherd*. He was buried in Westminster Abbey, where a

## Jordan

monument was erected to his memory with the inscription, "O rare Ben Jonson." Jonson's best dramas are excellent in plot and development, have strongly conceived characters and excellent traits of humor, but he is sometimes forced and unnatural and deals perhaps too much with passing manners and eccentricities. He had a genuine lyrical power, which is seen in his short poems and the songs interspersed in his masques.

**Jop'lin**, Mo., one of the county-seats of Jasper co., 68 mi. w. of Springfield on the Missouri Pacific, the Saint Louis & San Francisco and other railroads. The city is in the center of the zinc and lead fields of southwestern Missouri, which are the most important in the United States. There are extensive smelting works, white lead and paint factories and large foundries, machine shops and flouring mills. A valuable trade from a large agricultural district centers here. The especially notable structures are the Federal building, the Carnegie library, the opera house, the Conner Hotel, the high school building and the Y. M. C. A. Joplin was settled in 1870 and was incorporated three years later. Population in 1910, 32,073.

**Jop'pa.** See JAFFA.

**Jordaens**, *yor'dahns*, JACOB (1593-1678), a leading Flemish painter, noted for the masterly realism shown in his portraits, historical paintings and home scenes. There are a great many of his works in the principal European galleries. His *Admiral Ruyter*, in the Louvre; his *Christ Driving the Money Lenders from the Temple*, in the Louvre, and *The Bean Feast*, in Vienna, are typical of the three classes of paintings which he executed.

**Jor'dan**, the most important river of Palestine. It rises in the northern part and is formed by the union of several small streams, which have their sources in the mountains. The river flows southward through Lake Huleh, or the biblical Merom, the Lake of Tiberias, or Sea of Galilee, and enters the northern end of the Dead Sea. The distance between its source and its mouth in a straight line is about 65 miles, but owing to its winding course the length of the river is 200 miles. The Jordan is a very rapid stream and descends during its course from an altitude of about 700 feet above sea level to that of 1300 feet below sea level. Between Lake Huleh and the Sea of Galilee the river falls 69 feet to the mile, and below the Sea of Galilee its average fall is 9 feet to the mile. Where it enters Lake Huleh it is about 100 feet wide;



## Jordan

between the Sea of Galilee and its mouth it varies in width from 90 to 250 feet, and at its mouth it is 540 feet wide. Its usual depth below the Sea of Galilee is from 2 to 3 feet, but occasional depressions in the river bed cause pools of greater depth. Except during the period of flood, the river is navigable in many places. It is also crossed by a bridge at a point a little below Lake Huleh and another below Lake Tiberias.

The Jordan flows through a remarkable valley, which consists of a smaller valley within a large one. The great valley, called the Ghor, varies in width from 1 to 16 miles and is bounded by precipitous ridges, which in places attain a height of from 3000 to 4000 feet. The small valley, called the Zor, which is the real valley through which the river flows, is narrower, varying from  $\frac{1}{2}$  mile to 2 miles in width, and in many places is bounded by steep sides. During the rainy season the valley of the Jordan is covered with grass; and trees, such as the tamarisk, the acacia, the oleander and other trees, flourish. The Jordan is of unusual historical interest, because of the events connected with the life of Christ and the Chosen People, which occurred along its banks and in the immediate vicinity. See PALESTINE.

**Jordan, DAVID STARR** (1851- ), an American educator. He was born in Gainesville, N. Y., and attended Cornell University, where he became instructor in botany in 1870. Two years later he was professor of botany and biology in Lombard University, Galesburg, Ill., and at this time he began the study of fishes under the instruction of Agassiz. From 1875 to 1879 he was a professor in biology at Butler University, Indianapolis, Ind., and later, in 1885, after having served as professor of zoölogy at the University of Indiana, he was made president of that institution. For many years Jordan was connected with the United States Fish Commission and made many valuable researches and investigations. From 1891 to 1913 he was president of Leland Stanford Junior University, which became a great university under his direction. Upon his retirement the position of chancellor was created for him, in order that he might maintain some connection with the university and yet give further study to the problems of international peace and arbitration, of which he is a leading advocate. In addition to many reports and papers prepared for the Fish Commission, he has written various books, including a *Manual of Vertebrate Animals of the Northern*

## Joseph

*United States, Science Sketches, Fishes of Northern and Middle America and Imperial Democracy.*

**Joseph, jo'sef**, one of the two sons of the patriarch Jacob by his favorite wife, Rachel. His father's preference for him aroused the jealousy of his elder brothers, who sold him to some Ishmaelitic slave dealers, by whom he was sold to Potiphar, a distinguished officer in Egypt. The story of his elevation to the position of vice-regent of Egypt, and the settlement of his father and brothers there is well known (*Gen.* XXXVII, XXXIX-XLVIII). Authorities still differ as to the period in Egyptian history to which Joseph's life belongs, some placing it before, others under, and others after the time of the Hyksos, or shepherd kings.

**Joseph**, the husband of Mary, the mother of Jesus, was a descendant of the House of David, though resident at Nazareth, where he followed the trade of a carpenter. Early tradition repre-



DAVID STARR JORDAN

sents him as an old man at the time of his marriage, and he seems to have died before the commencement of the public ministry of Jesus. His day in the Roman Catholic calendar is March 19.

**Joseph II** (1741-1790), Holy Roman emperor, son of Francis I and Maria Theresa. He was elected king of the Romans in 1764, and on the death of his father in the following year he became German emperor, succeeding his mother, however, in the hereditary estates of the house

## Josephine

of Austria only in 1780. He at once commenced an extensive scheme of reforms, but the country was not prepared for such sudden changes, and he was compelled to give up most of his plans. Religious freedom was allowed throughout his dominions. In 1788 he made war against Turkey, which resulted unfavorably for Austria.

**Josephine**, *zho za feen'*, MARIE ROSE (1763–1814), empress of the French, wife of Napoleon Bonaparte. She was married to the Vicomte de Beauharnais, by whom she had two children, Eugène and Hortense. In 1794 her husband, who had been commander of the army of the Rhine, was executed by order of the Convention. After the fall of Robespierre she paid a visit to Napoleon to thank him for restoring the sword of her husband, and she so pleased him that he soon after married her (1796). She became a beneficial element in his life, and her amiable manners won the hearts of everybody and helped to secure her husband's position. When Napoleon ascended the throne in 1804 she was crowned along with him. But the fact that the union was childless stood in the way of Napoleon's ambition to become the founder of a dynasty, and in 1809 Josephine was divorced. She retained the title of empress, and was allowed a large annual grant.

**Joseph of Arimathea**, a member of the Jewish sanhedrin, who, though a believer in Jesus, had not the courage to make open profession of his faith. Nevertheless, after the crucifixion he went to Pilate, begged the body of Jesus and with Nicodemus buried it in his own garden.

**Josephus**, *jo see'fus*, FLAVIUS (37–?), a Jewish historian. In 64 A. D. he made a journey to Rome, and on his return he found his countrymen preparing to throw off the Roman yoke. Having tried in vain to persuade them of the hopelessness of such a struggle, he accepted the post of defending the Province of Galilee and actually held the fortified town of Jotapata against the whole Roman army for forty-seven days. He was captured at the fall of the city, was afterward present in the Roman army at the destruction of Jerusalem (70 A. D.) and went with Titus to Rome, where, assuming the family name of his patron, Flavius, he lived in learned leisure. Here he wrote (in Greek) *The History of the Jewish War*; *Jewish Antiquities*, giving a history of the Jews from the earliest times to the reign of Nero, and an *Autobiography*, mostly relating to the time of his military activity. The

## Joubert

date of his death is uncertain. It is known that he saw the end of the century.

**Josh Bil'lings**. See SHAW, HENRY WHEELER.

**Josh'ua**, the successor of Moses in the command of the Israelites, the son of Nun, of the tribe of Ephraim. He was nominated by Moses to succeed him in the command of the army of Israel, led the Israelites over the Jordan and in the course of seven years conquered the greater part of Palestine and divided the country among the tribes. He died at Timnath-Serah, in Mount Ephraim, at the age of 110. His history is contained in the book which bears his name and of which he is usually regarded as the author.

**Josi'ah**, king of Judah, succeeded his father Amon at the age of eight years (639 B. C.). He took an active part in the reform of public worship and commenced the restoration of the temple, during the progress of which the high priest Hilkiah discovered the book of the law, thought by some to be substantially the same as the book of *Deuteronomy*. The prescriptions it contained gave a decided direction to the reform movement, which the king conducted with great vigor. In his thirty-first year, prompted probably by friendship for the king of Assyria, he marched out against Pharaoh Necho, who was on his way to attack that kingdom. The two armies met at Megiddo, where Josiah was slain.

**Jotuns**, *yo'toonz*, in northern mythology, immense giants and magicians, who had command over the powers of nature and lived in dark caves in their kingdom of Jotunheim, from which they waged perpetual war against the gods. Originally they represented the destructive forces in nature. They were cunning, malignant, versed in witchcraft, but not highly intelligent.

**Joubert**, *zhoo bair'*, PIETRUS JACOBUS (1831–1900), a Boer general and statesman, born in Cape Colony, of Dutch Huguenot parents. He moved to the South African Republic and engaged successfully in farming and cattle raising. He was elected to the legislative assembly of the Republic and became attorney-general. In the campaign against the British in 1880 and 1881, Joubert was commander general of the Boer forces and won fame for his military ability. Several times he acted as president of the Republic in the absence of that official, and throughout his career he was in favor of a liberal policy toward the English residents of the country. In the great contest of 1899–1900 he proved himself to be one of the



## Jourdan

ablest generals on either side. Early in 1900 his health failed, and he retired to Pretoria, where he soon afterward died.

**Jourdan**, *zhoor dahn'*, JEAN BAPTISTE, Count (1762-1833), marshal of France. He fought in the American Revolutionary War, under d'Estaing, and on the outbreak of the French Revolution he was made a captain of the National Guard at Limoges. Later he was chief of battalion, brigadier general, general of division and, finally, commander in chief of the army of the north. He won several victories over the Austrians during 1793 and 1794, but during the two years that followed, he was less successful and consequently resigned his command. In 1799 he was placed in command of the army of the Danube, but was removed from command after a defeat by the Austrians. Napoleon made him governor of Piedmont in 1800, and later he became chief of staff to Joseph Bonaparte. He was in favor under Louis XVIII, but took part in the Revolution of 1830, after which he held for a short time the office of minister of foreign affairs.

**Journalism**, *jur'nal iz'm*. See NEWSPAPER.

**Journalism**, SCHOOL OF, a college of Columbia University, founded in 1903 by Joseph Pulitzer of the New York *World*. The school has an endowment of \$2,000,000. It is the purpose of this school so to train men in journalism as to make the newspaper profession one of higher character and standing, and to increase its power and prestige through the better equipment of those who follow it. The course of study includes the ethics and law of journalism, besides a serviceable course in general ethics and practical law, rhetoric and composition, with especial regard to the requirements of newspaper work; advanced courses in literature, United States history, contemporary European history, economics, sociology and political science.

Other universities in the east and in the central west have organized courses in training for journalism along about the same lines as that of Columbia, though with somewhat less elaborateness.

**Juan Fernandez**, *hwahn fer nahn'dath*, known, also, as Mas-a-Tierra, a group of small islands in the South Pacific Ocean, about 400 mi. off the coast of Chile, to which the group belongs. They are of volcanic origin and reach in some parts a height of 6000 feet. Parts are fertile, producing various kinds of timber, peaches, figs, grapes and cherries. The islands are occupied by some hundreds of settlers, whose

## Judas Tree

chief occupation is cattle raising. De Foe is said to have founded his *Robinson Crusoe* on the history of the solitary residence here for over four years (1704-1709) of a Scotch sailor, Alexander Selkirk. The islands were discovered in 1574 by Juan Fernandez.

**Juarez**, *hwah'res*, BENITO PABLO (1806-1872), president of the Mexican Republic. He was born of pure indian parentage, received a good education, was admitted to the bar and after holding various important public offices, was elected president in 1861. As the Mexican government at his accession was bankrupt, he declared the suspension of payments on the foreign debt for two years, a step which occasioned the interference of Britain, Spain and France. Troops were landed in Mexico in 1862, but Britain and Spain soon retired, leaving Napoleon III to carry out his plans alone. Maximilian of Austria came, on Napoleon's invitation, to assume the throne, but Juarez, in spite of defeats and losses, continued to head a resistance, and when Napoleon under pressure from the American government withdrew his troops in 1866, the republicans carried all before them. Maximilian was captured and shot, and Juarez was reelected to the presidency (1867), which he held till he died. See MAXIMILIAN; MEXICO, subhead *History*.

**Ju'bilee**, a festival of the Jews, held every fiftieth year. During this year all slaves or captives were to be released; all estates which had been sold reverted to their original proprietors or their descendants, unless it were a house in a walled city, and the ground was to lie fallow. It has been doubted whether the law of jubilee was ever actually observed until the return from Babylonian exile, when, for a time at least, it came into operation.

**Jud'ah**, the fourth son of the patriarch Jacob by his wife Leah, the forefather of one of the twelve tribes.

**Ju'das** surnamed *Iscariot*, meaning, perhaps, the man of Kerioth, a village of Judea, was one of the twelve apostles of Jesus and betrayed his Master into the hands of the Jewish priests for thirty pieces of silver. Remorse for his crime led him to suicide.

**Judas** or **Jude** brother of James, one of the twelve apostles. Matthew and Mark call him Thaddeus, surnamed Lebbaeus. Nothing is known of his life. By many he is considered the author of the *Epistle of Jude*.

**Judas Tree** a name given to a number of trees of the same genus and belonging to the

same family as the locust. The name originated in the tradition that Judas hanged himself on one of these trees, which grow wild throughout the Orient, in southern Europe and in tropical America. One species, called the *red bud*, is common in the warmer parts of the United States. This has pointed leaves and produces numerous clusters of bright red flowers in early spring, before the leaves appear on the branches. The buds of most species are esteemed as a delicacy.

**Judd**, ORANGE (1822-1892), an American farmer and journalist, born near Niagara Falls, N. Y. He graduated at Wesleyan University and soon after began the publication of the *American Agriculturist*. In 1883 he founded the *Prairie Farmer* and in 1888 the *Orange Judd Farmer*, which is still published. Through his influence much legislation in the interest of the agricultural classes was passed by Congress and by state legislatures.

**Jude**, one of the books of the New Testament. Its acceptance by the early Church was delayed until, like the writings of the evangelists, its divine inspiration was undoubted. In it the apostle denounces the heresies of the Simonians, the Nicolaites and the Gnostics and appeals to the members of the Christian Church to adhere faithfully to its teachings. Jude's epistle was written in Palestine about 62 A. D.

**Jude'a**, a term applied, after the return of the Jews from exile, to that part of Palestine bounded on the east by the Jordan and the Dead Sea, on the north by Samaria, on the west by the Mediterranean and on the south by Arabia Petraea. See PALESTINE.

**Judge**, *juj*, a person duly invested with authority to determine questions between parties according to law. The term is quite a general one, being applicable to any one appointed to sit in a court of law and try cases; but certain judges are designated by particular titles, as *justice* and *lord-justice*. The judge at common law decides points of law and enables the jury rightly to decide questions of fact, while in equity he decides both classes of questions. A judge cannot be prosecuted for the consequences of his decisions, except in the case where he may have acted without jurisdiction, nor can he officiate in a case where he has a personal interest, unless it be merely his common interest as a citizen. See LAW; COURTS; PROCEDURE.

**Judges**, BOOK OF, one of the books of the Old Testament, so called because the greater part of the narrative is occupied with the history of the judges who were raised up to deliver their

countrymen from the oppression of their neighbors.

**Judgment**, in law, the judicial determination and decision of a court in an action. It is either *interlocutory* or *final*. In the former case it is given only on some particular point or proceeding; upon the final judgment execution may follow, unless it be appealed against, suspended or recalled. See PROCEDURE.

**Judgment**, in psychology, the process of comparing two concepts and deciding that they agree or disagree. The formation of a judgment is the second step in thinking (See THOUGHT). It is more difficult than the formation of concepts, because in the formation of judgments two concepts must be held in mind, while in the formation of a concept, we group together the qualities belonging to the object before us and decide that these qualities also characterize the class to which these objects belong. In forming the concept of gold, for instance, from observation we obtain the idea of color, hardness, weight and malleability, all from the object under consideration. But in forming a judgment we hold in mind two distinct ideas, both of which are abstract, and from our comparison we decide that they agree or disagree. Judgment combines concepts and unites knowledge and makes it more valuable. Correct judgments can be formed only from accurate concepts and by following the laws of thought. See CONCEPT; REASON.

**Judiciary**, *ju dish'e a ry*. See COURTS.

**Ju'dith**, widow of Manasses, a Jewish heroine, whose history is given in the apocryphal book which bears her name. According to this book, Judith went to the tent of Holofernes, an Assyrian general who was besieging Bethulia, the city in which she lived, and charmed him with her beauty. A banquet was served in her honor, and after it, while Holofernes lay in drunken sleep, Judith cut off his head.

**Jud'son**, ADONIRAM (1788-1850), an American missionary, born in Malden, Mass. He was a graduate of Brown University and of Andover Theological Seminary, and in 1812 sailed for India with his bride. They settled in Rangoon and joined the Baptists. Judson translated the New Testament into Burmese, 1817-1821, completed the Bible translation in 1833 and later made a Burmese-English dictionary. During the Burmese war Judson was imprisoned. His wife, author of *History of the Burmese Mission*, died in 1826. His second wife, widow of G. D. Boardman, died on a voyage to America in



## Juggernaut

1845. His third wife wrote under the pen name *Fanny Forester*. Judson died at sea on his way to Mauritius.

**Jug'gernaut** or **Jagannatha** (lord of the world), the name given to the Indian god Krishna and to a very celebrated idol of this deity in a temple specially dedicated to Jagannātha at Puri, on the Bay of Bengal. The idol is a rudely cut wooden image, with a red body, black face and gilt arms; the mouth is open and blood-red; the eyes are formed of precious stones. It is covered with magnificent vestments and is seated upon a throne between two others—his brother Bala-Rama and his sister Subhadra, colored respectively white and black. Great numbers of pilgrims, sometimes a hundred thousand, at the time of the festivals of Jagannātha, assemble from all quarters of India to pay their devotions at this shrine. On these occasions the idol is mounted on a huge car resting on sixteen wheels and is drawn by the pilgrims to his summer home. The task requires several days, on account of the great weight of the car and the sandy condition of the roads, and the pilgrims, becoming exhausted, usually secure professional car haulers to complete the task. There is no truth in the popular belief that the devotees prostrate themselves before the car to be crushed.

**Ju'gular Vein**, one of the large trunks by which the greater part of the blood that has circulated in the head, face and neck is returned to the heart. There are two jugular veins on each side, an external, or superficial, one, lying just underneath the skin, and an internal, or deeper, one, near the carotid artery.

**Jugur'tha** (?-104 B. C.), a king of Numidia, the grandson of Masinissa. He was brought up at the court of his uncle, the king of Numidia, and after his uncle's death he succeeded in wresting the kingdom from his cousins. When, at the solicitation of the deposed princes, Roman armies were sent against Jugurtha, he bribed the generals and for many years exercised his power unchecked. Q. Caecilius Metellus, who was sent against him in 109 B. C., finally defeated him and compelled him to flee from the country. Marius further prosecuted the war and in 104 B. C. took Jugurtha a captive to Rome.

**Ju'jube**, the popular name of a genus of spiny shrubs or small trees. There are numerous species, several of which bear a blood-red or saffron-colored fruit, which is wholesome and pleasant to eat. The fruit of the common jujube, which has been introduced from Syria

## Julian

into Europe, resembles an olive in size and shape. The jujube paste, which is used as a confection, is no longer made from the jujube fruit, but is prepared from gum arabic with sugar and the whites of eggs. Tradition says that the crown of thorns which was placed on the head of Christ was made from the spines of the jujube.

**Ju'lep**, in medicine, a solution of sugar in aromatic water, not so concentrated as syrup. In the United States the name is given to a drink, composed of brandy or whisky, sugar, pounded ice and a seasoning of mint. It is also called mint julep.

**Ju'lian**, in full, Claudius Julianus, called *The Apostate*, (331-363), Roman emperor. He was brought up in the Christian religion, studied philosophy and letters and resided in Athens, where he was induced to accept paganism. Having received command of an army against the Alemanni, he defeated them at Strassburg and drove them beyond the Rhine. He also displayed great talent as an administrator in Gaul. The emperor now became jealous of Julian and recalled his best troops, under pretense that he wanted to employ them against the Persians. This order caused a rebellion among the soldiers, who proclaimed Julian emperor in 360, in spite of his own resistance. Constantius prepared to proceed against him, but soon after died, and Julian was generally recognized as emperor. He sought to restore the heathen worship in all its splendor, and on that account he opposed Christianity as much as was in his power, without, however, persecuting the Christians themselves. In 363 he headed an expedition against the Persians and took several cities, but was mortally wounded in a battle.

**Julian**, GEORGE WASHINGTON (1817-1899), an American political leader, born in Centerville, Ind. After an academic education he was admitted to the bar in 1840 and immediately entered politics. He served in the state legislature, was prominent in the free soil movement in 1848 and was elected to Congress in the following year. In the succeeding presidential election (1852) he was candidate for vice-president on the Free-Soil ticket with John P. Hale. At the organization of the Republican party he joined the movement and was a conspicuous adherent of the party for many years. From 1860 to 1870 he held a seat in Congress, but two years later he joined the Liberal Republican movement and from that time acted with the

## Julian Calendar

Democrats. His last public office was surveyor-general of public lands in New Mexico, an appointment which he received from President Cleveland.

**Julian Calendar.** See CALENDAR; EPOCH.

**Jul'ius**, the name of three popes. **JULIUS I** reigned from 337 to 352 and was noted for the assistance that he gave to the bishops in their opposition to the son of Constantine. He is considered a saint, and his day is observed on April 12. **JULIUS II** reigned from 1503 to 1513. He gave his attention chiefly to the political and military movements that resulted in a complete restoration of papal sovereignty and the extinction of foreign rule in Italy. In 1508 he entered into the League of Cambrai with Louis XII, the emperor Maximilian and Ferdinand of Aragon, but when the purposes of this league had been attained he withdrew and joined the Holy League, thus forming an alliance in opposition to the league that he first joined. The Holy League secured a controlling influence in France, northern Italy, Bologna, Reggio and some smaller Italian states and secured these to the papal government. Before the papal power could be further extended, however, Julius died. **JULIUS III** was pope from 1550 to 1555. He was one of the three legates appointed to preside over the Council of Trent, which he reopened as pope in 1551.

**Jul'lundur.** See JALANDHAR.

**July'**, the seventh month in our calendar, having 31 days. In the Roman year it bore the name of *Quintilis*, as originally it was the fifth month. Its change of name to *Julius* was in honor of Julius Caesar, who was born on the 12th of the month.

**July**, **COLUMN OF**, a bronze column in Paris in the Place de la Bastille, in commemoration of the citizens who fought for the liberty of France, July 27, 28 and 29, 1830. The column bears the names of the 615 who fell in the revolution, and in the vaults below are the bodies of these victims and also those of the Revolution of 1848.

**July Revolution**, the name given to the revolution in France in 1830 which placed Louis Philippe on the throne and drove out the restored House of Bourbon. The reactionary policy of Louis XVIII and Charles X had made the Bourbon dynasty exceedingly unpopular, and when, in July, 1830, edicts interfering with the liberty of the press and with the franchise privileges were issued, matters came to a climax at once. The July Revolution in France extended

## Juneau

little beyond Paris, but its influence was wide and affected seriously other European countries.

**Jumping Bean**, a name given to the seeds of a number of different plants of the spurge family, because the seeds when laid upon a level surface will move about by jerks and jumps. The motion is caused by a larva or small grub which lives in the seed until ready for its transformation into a moth. The plants and insects are found in Central and South America. *Bronco beans* is a local name for the seeds.

**Jumping Mouse.** See DEER MOUSE.

**Jun'co**, the popular name of several species of dark slaty or ash-colored birds which show more or less white below and have white bills. All are small finches, and the slate-colored junco is seen in large numbers among the earliest of the spring migrants in the northern United States east of the Rocky Mountains.

**Junction City, KAN.**, the county-seat of Geary co., 135 mi. w. of Kansas City, at the junction of the Republican and Smoky Hill rivers and on the Union Pacific and the Missouri, Kansas & Texas railroads. The city has extensive limestone quarries and is an important shipping point for grain, live stock and other farm produce. Fort Riley, a large army post, is three miles east of the city. The waterworks are owned and operated by the municipality. Population in 1910, 5598.

**June**, the sixth month in our calendar. It consisted originally of twenty-six days, to which it is said Romulus added four, and from which Numa took away one. Julius Caesar again lengthened it to thirty days, and it has ever since remained unaltered.

**Juneau, joo no'**, the capital of Alaska, situated on Gastineau Channel, 110 mi. s. of Skagway and 160 mi. n. w. of Sitka. It is in the center of a mining district and is near the Treadwell gold mines on Douglass Island and the Silver Bow mines. It is the largest town in that part of Alaska, has banks, an electric light plant and newspapers and is connected directly with Seattle, San Francisco and other Pacific towns by steamer. Other lines also give it communication with Sitka, Nome and Skagway. It is an important point for miners' supplies and was made the capital of the territory in 1906. Population in 1910, 1644.

**Juneau, LAURENT SOLOMON (1793-1856)**, an American pioneer, founder of Milwaukee, Wis., born in Canada. He became an indian trader and soon went to Wisconsin, settling first at Green Bay and then at the site of Milwaukee



Obtaining possession of a large tract of land ceded by the indians, he began the crection of a village and became first postmaster and president. He was also first mayor of the city. He lost most of his property, which at one time was immensely valuable, and died in comparative poverty.

**June'berry**, a North American wild tree common in Canada and the United States, allied to the medlar. The fruit is pear shaped, about the size of a large pea, purplish in color, and it is a good article of food. *Service Berry* and *shad bush* are other names.

**June Bug or May Beetle**, a common clumsy beetle that buzzes around the lights in summer evenings, frequently bumping into walls and falling to the ground. When numerous, the larvae, which are fat, white grubs, are injurious to lawns and meadows.

**Jungfrau**, *yoong'frow*, (maiden), a mountain of Switzerland, in the Bernese Alps, on the frontiers between the cantons of Bern and Valais, 12 mi. s. s. e. of Interlaken. It is one of the most magnificent mountains in Switzerland and is 13,670 feet high. It was first ascended in 1808, and since that time the ascent has often been made. An electric railway ascending the mountain was opened in 1903. A striking feature of the route is a tunnel over six miles in length.

**Jungle**, *jun'g'l*, properly, an Indian term applied to a desert and uncultivated region, whether covered with wood and dense vegetation, or not; but in English it is applied to land covered with forest trees, thick, impenetrable brushwood or any coarse, rank vegetation. The densest jungles occur in the tropical regions.

**Jungle Fever**, a severe variety of remittent fever, occurring in the East Indies and other tropical regions. Cold and hot stages alternate, the fever usually appearing at night and disappearing in the morning.

**Jungle Fowl**, one of a genus of birds of which four species are known, living in the East Indies and northern India. The most common species is much like our domestic fowls, and it is believed that the barnyard poultry have descended from these birds.

**Ju'niper**, a genus of evergreen, shrubs and trees of the cone-bearing family, growing in both Europe and the United States. About thirty species are known. The common juniper is a straggling bush which bears a bluish-black berries, that require two years to mature. In Holland they are used extensively in the prepa-

ration of gin, and from them an important medicinal oil is prepared. One species of juniper furnishes the common red cedar of North America, a wood valuable to cabinetmakers and in the manufacture of pencils.

**Ju'nius Letters**, THE, certain letters on public affairs which first appeared in the *Public Advertiser*, a London paper published by Henry S. Woodfall, from which they were copied into most of the other journals of the time. The earliest bears the date Jan. 21, 1769; the last, Jan. 21, 1772. After they were completed they were collected and published by Woodfall, with a dedication to the English nation and a preface by the author. Although so long a time has elapsed since the publication of these papers, their authorship seems as far from being settled as ever. It was evident from the first that the author was fully acquainted with British politics, with the proceedings of both houses of Parliament and with the characters of all the leading statesmen. To this wide information he united a boldness, vehemence and rancor which, combined with his epigrammatic and unsparing invective, rendered him an object of terror to those whom he attacked. Public suspicion at the time was fixed most strongly on Burke and Viscount Sackville. But Burke denied the authorship to Dr. Johnson, and on several points Burke and Junius were in direct opposition to each other. That Viscount Sackville was the author received considerable belief for some time. But it is now generally believed that Sir Philip Francis was Junius, although all the evidence is but circumstantial.

**Junk**, a flat-bottomed ship used in the waters of China and Japan, sometimes reaching 1000 tons. It has a high forecastle and poop and ordinarily three masts of considerable height, each mast being made in one piece, with a lug-sail, generally of bamboo splits. The bow is bluff, the stern is full and the rudder is very large.

**Ju'no**, called *Hera* by the Greeks, was, in classical mythology, queen of the gods, sister and wife of Jupiter. The life of Jupiter with his queen was not represented by poets as an exceedingly happy one, for Jupiter was an unfaithful husband, and Juno was a very jealous and exacting wife. Much of her time, therefore, was of necessity spent in devising punishments for Jupiter's mortal wives or their sons. She was represented as a beautiful woman of matronly aspect, attended by the nymphs and the hours and, particularly, by Iris. The goose, the

## Junot

cuckoo and the peacock were sacred to her. As the special protectress of all that concerned marriage or the birth of children she was particularly worshiped by women.

**Junot**, *zhu no'*, ANDOCHE, Duke of Abrantès (1771-1813), a French marshal. He was made aid-de-camp to Napoleon in the Italian and Egyptian campaigns, and on his return from Egypt in 1800 he was made commandant of Paris. As he did not fill that position satisfactorily, he was sent in 1805 as ambassador to Lisbon. Leaving that post, he joined the army in Germany and distinguished himself at Austerlitz. While in a campaign in Portugal in 1807 he rendered such good service that he was made duke of Abrantès as a reward, but in 1808, after a defeat by Wellington, he made an unfavorable treaty with the English and as a result fell into disfavor with Napoleon. In 1812 he was made governor of Illyria, but it became plain at this time that as a result of a wound in the head, which he had received in the early Italian campaign, he was mentally deranged. He was brought back to Montbard in 1813 and there committed suicide.

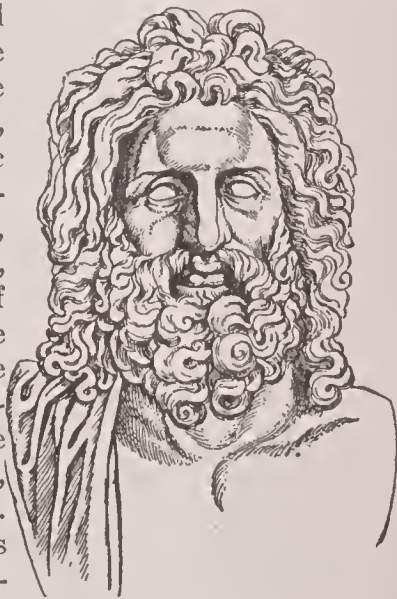
**Jun'ta** (Spanish, "an assembly"), in Spain and Spanish-American countries, a council of state. It was originally applied to an irregularly summoned assembly, as distinguished from the Cortes, or parliament, regularly called together by the authority of the king; but the name is now applied to legal bodies.

**Ju'piter**, the fifth planet from the sun, the largest planet of the solar system and, excepting the sun, the largest body. It is more than three times as large as all the other planets put together, and yet it is not more than 1/1000 part as large as the sun. The mean diameter of Jupiter is about 85,000 miles, and the mean distance from the sun over 75,000,000 miles. Jupiter rotates on its axis in 10 hours and is accompanied by seven moons. Until 1892 but four were known. Then the fifth satellite was discovered by Prof. E. E. Barnard, then of the Lick Observatory. A sixth was discovered at the same institution by C. D. Perrine in 1904, and a seventh by the same astronomer in 1905. As the inclination of Jupiter's axis is very small, changes in season must be almost unknown. Jupiter is recognized by the naked eye as, next to Venus, the brightest of the planets, and during January, 1908, February, 1909, and so on for several years, a month later each year, is the brilliant evening star. Jupiter and its satellites, making a miniature solar system, have always been studied with

## Jupiter

great interest by astronomers. Its surface shows belts of dark and light shade, which are usually, but not always, parallel to each other and undergo quick changes, seeming to merge one into another. These are thought to be masses of clouds, swept about by air currents in an atmosphere much heavier than ours. The moons appear from the earth to move in nearly straight lines from one side of the planet to the other, so that the planes of their orbits are nearly the same as those of Jupiter. They are eclipsed in the shadow of the planet, and their own shadows may be seen passing over the planet's surface. It was by observation of the eclipses of the satellites of Jupiter that Römer discovered that light does not travel instantaneously and computed its velocity. Through a telescope, Jupiter appears like a sphere more flattened at the poles and more bulging at the equator than our earth. It is probable that Jupiter is not a solid body, like Venus and Mars, but is still in a heated and probably partially gaseous state, resembling the sun except that the light given off is small.

**Jupiter** or **Jove**, the greatest of the Roman gods, called Zeus by the Greeks. He was the son of Saturn and Rhea, and in the division of the world by lot, which took place after the overthrow of Saturn, Jupiter received, as his share of the universe, the heavens and the earth, while Neptune received the sea, and Pluto, the lower world. His first wife was Metis, the goddess of wisdom, whom, to prevent



JUPITER

Zeus Otricoli, Vatican, Rome a prophecy that his first child should be wiser than himself, he swallowed. Shortly after, however, Minerva sprang full armed from his head, Juno was the chief wife of Jupiter, but he was by no means always faithful to her and was constantly pursued by her jealousy. Besides the goddesses Themis, Ceres, Mnemosyne and Latona, he had many mortal wives, among them Alcmena and Antiope, Danae, Europa, Leda and Io. Among his children were the Fates, the Graces, the Muses, Apollo and Diana, Mars and Hebe



and many of the famous Greek heroes. Jupiter was represented in art as a man of middle age and dignified appearance, usually seated on a throne and bearing in his hands his spear and thunderbolts. He was usually accompanied by an eagle, his sacred bird.

**Ju'ra**, Fr. *zhurah'*, a mountain chain in central Europe, which covers parts of France, Switzerland and Germany. The main Jura is made up of a series of parallel ranges, with a length of 180 miles, in the form of a curve, and a breadth of 30 miles. The principal geological formation is the Jura limestone, with green sand, belonging to the lower cretaceous series. Stalactite caves are numerous, and fine forests are on the summits. The two chief rivers which have their source in the chain are both French—the Ain and the Doubs. They descend from its western slopes and belong to the basin of the Rhone. Its highest points are Crêt de la Neige, 5680 feet, Reculet, Dôle and Mont Tendre.

**Juras'sic System**, a system of rocks lying between the Triassic, below, and the Cretaceous, above, and named from the Jura Mountains in Switzerland, where the formations are especially prominent. The Jurassic is the middle system of the Mesozoic era. The formations are prominent in Europe, but in the United States they are comparatively unimportant. In California and Oregon they constitute some of the gold-bearing rocks, but are so closely related to those of the Triassic that it is impossible in many instances to tell to which system the formations belong. See TRIASSIC SYSTEM; MESOZOIC ERA; CRETACEOUS SYSTEM.

**Jurua**, *zhoo roo a'*, a river of South America, the most westerly of the large southern tributaries of the Amazon. It rises in the Andes Mountains in Peru and flows in a northeasterly direction. Its length is somewhat over 700 miles.

**Ju'ry and Trial by Jury**. The history of trial by jury is not traceable to its origin. It probably began among northern European races, the first known form being found among the Anglo-Saxons, where an accused person could summon twelve neighbors to swear to his innocence.

To-day in criminal trials two juries act, the *grand jury* and the *petit jury*. The former may consist of any number more than eleven and less than twenty-four men, whose names are drawn by lot from a list of eligible men and who are summoned by the sheriff of the county. Their names are returned on a piece of parchment, which is called a *panel*. After the oath has been admin-

istered they proceed to consider in private the charge, or *indictment*, which is brought against the accused. If twelve members agree that the accusation has a basis of truth they return a *true bill*. If they find that the accusation is unfounded they *ignore* the bill, and the accused is dismissed. Petit juries consist of twelve persons and are required in the trial of all criminal offenses and of all issues of fact in civil cases under the common law.

The petit jurors are chosen in the same manner as the grand jurors, but the attorney for either the defendant or the plaintiff in any suit has the right to challenge the right of any one to sit upon the jury for reasons either of prejudice or ignorance, or for other good cause. When once accepted, no juror is at liberty to leave his post without the court's permission. When a prisoner is charged with treason or felony the jurymen are usually allowed to retire only in custody of the sheriff or his deputies, who are sworn to keep them together and not to speak to them with reference to the case. When the evidence has been given, the presiding judge instructs the jury in the points of law which apply to it, leaving the jury to deal with the facts, and their decision is considered final. In considering the evidence they withdraw to a private room, and until reaching an agreement, or until it becomes evident that they cannot reach an agreement, no communication is permitted with other persons, even food and other necessities being supplied by officers of the court. If the twelve jurors fail to agree they are discharged by the judge, and the case can be tried anew before a new jury. An appeal can be taken from any verdict to a higher court upon showing some legal error in the conduct of the case, or upon the presentation of new important evidence.

The so-called *coroner's jury* is summoned to inquire into cases of sudden or violent death. This jury varies in size from six to twenty-three members. If any persons are found guilty of crime in connection with the death they are reserved for trial before a petit jury. See LAW; COURTS; PROCEDURE.

**Justice**, DEPARTMENT OF, one of the executive departments of the government of the United States. Though the office of attorney-general was organized in 1789, this official did not become a member of the president's cabinet until 1870. He is fourth in line of succession to the presidency. The department has charge of all legal business of the government, the attorney-general being the chief law officer.

## Justice of the Peace

It is his duty to advise the president and the secretaries of the departments in all legal matters, to represent the government in court, to direct the district marshals and attorneys of the government, to supervise the penal and reformatory institutions, to administer the national bankruptcy law and, when required, to revise and codify the Federal laws. See UNITED STATES, subhead *Government*.

**Justice of the Peace**, a judicial magistrate intrusted with the conservation of the peace. In the United States the office is held either by appointment or election, and the incumbent has judicial power in certain petty civil and criminal cases. He can examine offenders and hold them to upper courts for trial. In some states he has a right to celebrate marriages. In Great Britain the justice is practically appointed by the lord chancellor and has certain executive as well as judicial functions.

**Justification**, a theological term employed to designate the act by which a person is accounted just or righteous in the sight of God or placed in a state of salvation. This conception of God as a judge who absolves the sinner on account of Christ's merit and imputed righteousness, is based upon the writings of Saint Paul and received its most pronounced expression at or immediately after the Reformation.

**Justinian I**, in full. Flavius Anicius Justinianus, called *the Great*, (483-565), emperor of the East, was born of an obscure family. On the death of his uncle, the emperor Justin, with whom he had latterly shared the imperial power, he was proclaimed emperor. Aided by his generals Belisarius and Narses, he was able to restore to the Roman Empire a part of its former possessions, by victories over the Persians, victories in Africa and victories over the Ostrogoths in Italy. Turning his attention to the laws, Justinian commissioned ten learned civilians to draw up a new code, and the result was the *Corpus Juris Civilis*. He took great interest in building cities, fortifications and churches and rebuilt the Church of Saint Sophia at Constantinople. To maintain his public munificence he oppressed the people with taxes and suffered his servants to commit the most flagrant crimes. His reign of thirty-eight years was a great period in the history of the Empire, but the emperor himself was by no means great.

**Jute**, a textile fabric obtained from a plant belonging to the same family as the basswood. The jute plant is a native of the warmer parts of India, where its cultivation is carried on,

## Jutes

especially in Bengal, on an extensive scale. It is an annual, growing to a height of 12 or 14 feet. The fiber forms the inner bark of the plant and possesses in an eminent degree that tenacity common to the bark of the plants of this order. The fiber is fine and has a shining surface; it is injured by exposure to water and hence is not well adapted for cordage and canvas, but



JUTE PLANT

it is in extensive use for making bags, and in the United States and Great Britain it is mixed with hemp for cordage, and with silk in the manufacture of cheap satins. Its principal use is in the manufacture of coarse cloth for bagging and in making the foundation of inferior carpets and mats. In Bengal, jute has been cultivated, and its fibers have been woven into fabrics, from a remote period, but it is only since about 1830 that its manufacture has risen to importance in Europe. The headquarters of this branch of industry are at Dundee. The rice, cotton, sugar, coffee, pepper and other articles of East Indian commerce are almost wholly carried in gunny bags made from jute.

**Jutes**, a German tribe that assisted the Angles and Saxons in their conquest of England, in the fifth century. See ANGLO-SAXONS.



## Jutland

**Jut'land** (Danish, *Jylland*), the peninsula and most important portion of Denmark, surrounded on three sides by the sea—the Skagerrak, the Cattogat and the North Sea—and on the s. by Schleswig; it has an area of 9755 sq. mi. The surface is generally low and is diversified by a ridge of hills through the center of the peninsula. The west coast is sandy, and the east coast has many fjords. The inhabitants are considered to be the most genuine specimens of the old Danish stock and have preserved both the language and the manners and customs of early times in their greatest purity. The earlier inhabitants, the Jutes, took part in the expedition of the Saxons to England (See DENMARK). Population in 1911, 1,198,457.

**Ju'venal**, DECIMUS JUNIUS JUVENALIS, a Latin satirical poet, born probably about the middle of the first century A. D. He is said to have been the adopted child of a wealthy freedman; to have been by profession a pleader; to have been the friend of Martial, and to have died in Egypt as an exile in charge of a cohort of infantry. Nothing of this is authentic; we know certainly only that he resided in Aquinum and flourished about the end of the first century after Christ. His extant works are sixteen satires, composed in hexameters, giving in powerful language, inspired by a bitter and heart-felt indignation, a somber picture of the corrupt Roman society of that era. His satires have also been translated by Gifford and some of them by Dryden, while Johnson's imitations of two of them, under the titles *London* and the *Vanity of Human Wishes*, are well known.

**Juvenile Court.** It has long been a recognized fact that it cannot but be harmful to children to be brought, some of them for a first and

## Juvenal

very mild offense, into contact with the careless, often depraved crowd that fills the ordinary police court. The result of this conviction has been the establishing of special courts where juvenile offenders against the law may be tried. Massachusetts was the first state to provide for separate hearing of children's cases, but the first regular juvenile court was opened in Chicago in July, 1899. Two years later there was founded in Denver the most famous juvenile court in the world—that presided over by Benjamin B. Lindsey.

The idea on which these courts are based is that the child is not a criminal—that most children would rather be good than bad, if opportunity be given. Instead, then, of punishing the delinquent children brought before them, these courts attempt to educate them and plant in them ideas of right living. In many instances the every-day surroundings and the home influences are carefully studied, and action is taken to improve these, if possible. Some states give to the juvenile courts power to punish adult persons who through neglect or active wrong leading contribute to the delinquency of the child. Children are never to be put, before trial or afterward, with older criminals, and in most cases a probation scheme is tried, the child being allowed to go free but required to report at intervals to the court until his period of probation is over. Judge Lindsey has applied the honor system with great success. When boys have been sentenced to the Industrial School at Golden, he has permitted them to go unattended; and out of several hundreds so trusted, less than a dozen have failed him. The age limit of those tried in juvenile courts varies in different states, but is never over twenty.



**K**, the eleventh letter of the English alphabet, derived in its form from the Phoenician character, which resembled a reversed *k*. In Anglo-Saxon this letter was little used, *c* being regularly substituted for it. Gradually, however, it came to replace *c* in positions where the latter would be ambiguous in sound. It has but the one sound, and it is silent before *n*. In words of one syllable *k* is often used after *c* as a final letter, to secure the proper pronunciation of derived forms, as in *crack*, *cracked*.

**Kaaba** or **Caaba**, *kah'ba*, the sacred shrine at Mecca to which Moslems make their pilgrimages. It is a flat-roofed quadrangular structure about 40 feet high, 55 feet long and 45 feet broad, and stands in the center of the mosque, or sacred area, which is inclosed by walls and colonnades. At the southeast corner of the Kaaba, built into the wall, is the famous "black-stone," or *Keblah*, which is devoutly kissed by the pilgrim and is the point to which every pious Moslem directs his face in prayer.

**Kabul** or **Cabul**, *ka bool'*, capital of Afghanistan, 80 mi. n. n. e. of Ghuzni. It is situated on the Kabul River, at an elevation of 6400 feet above sea level. The citadel, Bala-Hissar, contains the palace and other public buildings and the fort. Kabul carries on a considerable trade with Hindustan through the Khyber Pass and is the center of an important fruit-growing district. It was taken by the British in 1839, in 1842 and again in 1879. Population, about 60,000.

**Kadiak**, *kad yak'*, an island south of Alaska, belonging to the United States. It is rocky and of little agricultural value. The inhabitants, below 3000 in number, resemble the Eskimos and live by hunting and fishing. A considerable fur trade is carried on, and the catching and canning of salmon is an important industry.

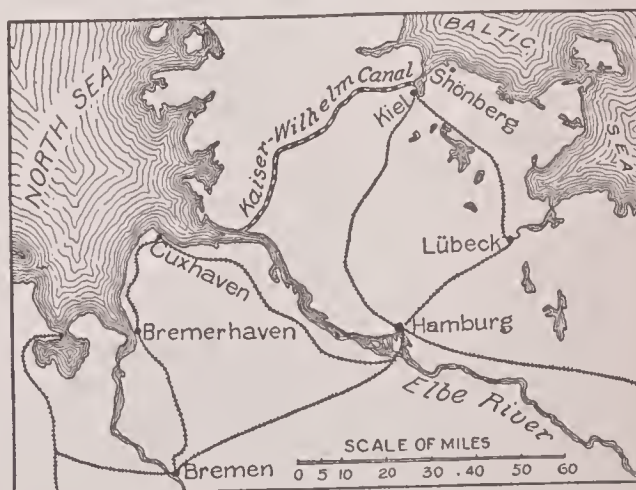
**Kadiak Bear.** See BEAR.

**Kaffir Corn**, a variety of millet. The seed was first brought from Kaffraria in Africa, but

the plant is now grown extensively in those Western states which are subject to drought.

**Kaffirs**, **Kafirs**, **Kaffres** or **Caffres**, *kaf'urz*, the principal race inhabiting south-eastern Africa, a branch of the great Bantu family. The name is now chiefly restricted to the tribes occupying the coast districts between Cape Colony and Delagoa Bay. They differ from the negroes in the shape of the head, which is more like that of Europeans, and in the high nose, frizzled hair and brown complexion, which becomes lighter in shade in the tribes of the more southern districts. They are a tall, muscular race, frugal and simple in their habits. Their chief occupation is raising and tending cattle and hunting; garden and field work is mainly performed by women. They have many times been in fierce and bloody conflict with the English.

**Kaiser Wilhelm Canal**, or **Kiel Canal**, a German waterway extending from Holtenau, on the Baltic Sea, to Brunsbüttel on the Elbe. As completed in 1895 it was 61.3 miles long, 190



KAISER WILHELM OR KIEL CANAL

feet wide at the surface and 29.5 feet deep. The original cost was \$39,000,000. The rapid growth of shipping and the increased size of vessels made a larger canal necessary. In 1908, accordingly, work was begun, and the enlarged



## Kalamazoo

canal was formally opened by Emperor William II on June 24, 1914. The new Kiel Canal is 140 feet wide at the bottom and 330 feet wide at the water surface. The depth is 36 feet, and there are eleven points at which the largest vessels may pass each other. The new locks at the ends are 1140 feet long and 46 feet deep, large enough to accommodate the largest dreadnought or ocean liner. The Kiel Canal was built primarily for its usefulness in case of war. It connects the North Sea with the Baltic, thus eliminating the need of a voyage around Denmark and enabling the German fleet to be quickly shifted from one sea to the other without exposure to attack. The canal is also used by merchant ships; in times of peace its annual tonnage is about ten times that of the Suez Canal.

**Kal'amazoo'**, MICH., the county-seat of Kalamazoo co., 50 mi. s. of Grand Rapids, on the Kalamazoo River and on the Lake Shore & Michigan Southern, the Michigan Central and several other railroads. The city is in an agricultural district where celery is the chief product, along with considerable quantities of fruits and grains. Kalamazoo College and the Western State Normal School are located here. Other important structures are the Michigan Asylum for the Insane, the city hall, the post-office, the public library and the Y. M. C. A. building. The manufactures include paper, wagons, buggies, windmills, engines, machinery, undertakers' supplies and various articles for women's wear. The place was settled by the Titus brothers in 1829 and was chartered as a city in 1884. Population in 1910, 39,437.

**Kalb**, *kahlp*, JOHANN, Baron de (1721-1780), a German-American soldier, born in Bavaria. He entered the French army in 1743 and received several promotions, becoming lieutenant general in 1761. Some years later he was a secret emissary of the French government in America and returned to France with a report favorable to the American cause. In 1777 he was persuaded by American representatives in Europe to join Lafayette's expedition, and upon arrival in America he was made a major general. He served with credit throughout the war, was second in command to General Gates in the South and commanded the American forces at Camden. In this engagement he received eleven wounds, from which he died a few days later.

**Kaleidoscope**, *ka li'do skope*, a well-known optical toy, invented by David Brewster, by

## Kalmia

which an infinite variety of symmetrical, and often beautiful, colored designs is obtained. The ordinary kaleidoscope consists of a tube containing three glass plates acting as mirrors, which extend along its whole length and make an angle of 60° with one another. One end of the tube is closed by a metal plate with a small hole at its center, to which the eye is applied; at the other end there are two plates, one of ground glass, the other of clear glass, the latter being nearer the eye. A number of pieces of colored glass or beads lie loosely between them. When the eye is applied to the aperture the mirrors produce a beautiful, symmetrical figure, and when the tube is turned about or shaken, new images, always symmetrical, are formed. This arrangement may be modified in various ways. The instrument has been used by designers of patterns for calicoes and other fabrics.

**Kal'ends**. See CALENDAR.

**Kal'er**, JAMES OTIS (1848- ), an American writer, born in Winterport, Maine. He has gained a wide reputation as a writer for young people, under the pen name *James Otis*. Among his most popular books are *Toby Tyler*, *Mr. Stubbs's Brother*, *Tom and Tip*, *The Wreck of the Circus* and *When Israel Putnam Served the King*.

**Kalevala**, *kah'la vah'lah*. The Finnish poems which have been preserved by oral tradition from the times of heathendom, were gradually dying out, when Lönnrot grouped together, in one whole, all the fragments he could find and published them as the national epic of the Finnish people, under the title of *Kalevala*.

**Kal'ispell**, MONT., the county-seat of Flathead co., is situated on Flathead River and on the Great Northern Railroad, 150 mi. n. w. of Helena. It has an important trade in lumber and agricultural products. The manufactures include lumber, flour and malt liquors. Population in 1910, 5549.

**Kal'mia**, a genus of North American shrubs, which bear cup-shaped rose or purple flowers in clusters. The kalmias belong to the heath family and are known commonly in the United States as laurel. All are more or less poisonous when eaten. The *mountain laurel*, or *calico bush*, has been carried from its home in the Alleghany Mountains to Europe, where it is a favorite garden shrub. The flowers of the kalmia have a peculiar arrangement for fertilizing themselves. When the flower opens, the stamens are bent back away from the pistil and

## Kalmucks

are held in little pockets in the corolla. Whenever an insect touches them they fly loose, scattering the pollen from little holes in the tops of the anthers. Some of the pollen falls upon the insect and is by him carried to the stigmas of other flowers, and in this way cross fertilization is secured. Under favorable conditions the trunk of the mountain laurel attains a diameter of three inches, and as the wood is hard like box, it is used by turners for small objects, such as handles to tools. The *sheep laurel*, or *lamb kill*, sometimes called *staggerbush*, is a small species of *kalmia* that poisons sheep.

**Kal'mucks** or **Calmucks**, a wandering, warlike Mongol race, originally natives of the territory of central Asia, but now inhabiting not only parts of the Chinese Empire, but also districts of Siberia and European Russia. They are intrepid soldiers and splendid horsemen, and troops of them are attached to almost every Cossack regiment. Many of the Russian Kalmucks have been converted to Christianity. Physically they are small of stature, broad-shouldered, with small, round heads and narrow, oblique eyes.

**Kama**, *kah'ma*, a river in Russia, rises in the northeastern part of the country and flows southerly and southwesterly and enters the Volga at Spask. Its length is about 1200 miles, and it is the longest tributary of the Volga. One of its tributaries is connected with a tributary of the Dvina by canal, so that it forms an important link in the waterways of the part of Russia through which it flows.

**Kama**, the Hindu god of love, corresponding, generally speaking, to the Greek Eros and Roman Cupid. He is represented as a beautiful youth riding on a parrot. He carries a bow, with a string formed of bees, and five arrows, each tipped with a flower.

**Kamerun**, *kah'me roon*, or **Cameroon**, a German colony in West Africa, at the head of the Bight of Biafra. It is bounded on the s. and e. by the French Kongo and on the n. w. by the British colony of Nigeria. The country takes its name from the Kamerun River, which flows in a southwesterly direction through it. Another and still longer river, the Sanaga, flows into the sea a little south of the Kamerun and is navigable for forty miles. The Kamerun Mountains extend through the colony from the southwest to the northeast and in some places attain an altitude of 13,760 feet. The most important products are the banana, the oil palm, the sweet potato, the ground nut, the

## Kane

manioc and the yam; and tobacco, coffee and cocoa are also successfully cultivated. A considerable trade in oil, cotton and ivory is carried on. The majority of the inhabitants are Bantus. Kamerun is the chief trading town and seat of government. The government is administered by a local governor, but his influence over the interior is only nominal. Germany annexed the coast in 1884 and the interior soon after. Population, estimated at 3,500,000; area, 275,000 square miles.

**Kamtchatka**, *kam chat'ka*, a large peninsula in the northeast of Asia, between the Bering Sea on the e. and the Sea of Okhotsk on the w. It is about 700 miles long, from 70 to 250 miles wide and has an area of 104,000 square miles. The chief wealth of the country lies in its fur-producing animals, which include the sable, the Arctic fox, the beaver and the bear. The Kamtchadales, once the predominant race of the peninsula, are a branch of the Mongul family, a low type, physically and morally; but they are rapidly vanishing before the Russian settlers. The Koryaks are a wandering tribe, living in the northern districts. Population, estimated at 7500.

**Kanakas**, *ka nah'kas*, the native inhabitants of the Hawaiian Islands. In New Caledonia and the New Hebrides the name is applied to all the native laborers, without distinction of origin.

**Kanawha**, *ka naw'wa*, **River**. See GREAT KANAWHA.

**Kandahar'** or **Candahar'**, a town of considerable commercial and strategical importance in the south of Afghanistan, on the direct route to India, 210 mi. s. w. of Kabul. It lies 3484 feet above the sea, and has a large transit trade in silk and felt, chiefly carried on with British India. The town is said to have been founded by Alexander the Great. Population, estimated at 35,000.

**Kandy**, *kahn'de*, a fortified town in Ceylon, the former capital of the island, situated 82 mi. from Colombo. It contains the palace of the former king and a number of Buddhist temples. Near by are botanical gardens of considerable celebrity. Population in 1910, 29,928.

**Kane**, PA., a borough in McKean co., 95 mi. s. e. of Erie, on the Baltimore & Ohio, the Pennsylvania and other railroads. It has an elevation of over 2000 feet, with a healthful climate and good hunting and fishing, and has become a popular resort. The region is rich in oil and natural gas, and large glass works, lumber mills, wood-working shops and other fac-



## Kane

tories are located here. Population in 1910, 6626.

**Kane**, ELISHA KENT (1820-1857), an American surgeon, traveler and Arctic explorer. He obtained the degree of M. D. at the University of Pennsylvania in 1842, was attached as surgeon to the American mission to China and afterward visited India, Egypt and Greece. In 1846 he rendered important service as a volunteer in the United States army in Mexico, and in 1850 he joined the Grinnell Expedition, as medical and scientific member, in the unsuccessful search for Sir John Franklin. His observations led him to the belief that there was a large open sea near the pole, and with a view to penetrate it he organized and commanded a second expedition, which left New York in the *Advance* in May, 1853. He succeeded in getting as far as 78° 43' north latitude, where he was frozen in for twenty-one months. Finally, being harassed by scurvy and want of provisions, he was obliged to abandon the vessel. A perilous journey of 1300 miles in boats and sledges brought him back to Greenland, and he again reached New York in November, 1855. Much broken in health, he sailed for Cuba to recuperate, but died there. (See NORTH POLAR EXPLORATION.)

**Kan'garoo'**, the common name of a number of animals native of Australia. The most



KANGAROO

noticeable feature about the kangaroo is the disproportion between the upper and lower parts of the body. The head is small and deer-like in shape, with large ears; the fore legs are small, and the hind legs are relatively large and powerful. The tail is long and thick at the base and helps to support the animal when it sits erect, and to assist it in its long leaps. When moving at an ordinary rate, the kangaroo jumps about its own length, but when frightened it can leap from three to four times that far. The young are born very immature, being in most instances

## Kansas

less than an inch long, and are protected and nourished for about eight months in a pouch on the mother's abdomen. Kangaroos live entirely upon vegetable growths, and where still plentiful, they are a serious pest to farmers. They are very timid, but are alert in time of danger. The kangaroos include many species, varying in size from that of a hare to that of a large sheep, and remains of still larger extinct species have been found in Australia. The larger and more common kinds belong to a genus including the *giant kangaroo*, the *red kangaroo* and the *brush kangaroo*. One of these large kangaroos can kill a dog with a blow of its hind foot. The animals are hunted for their hides, which make excellent leather, and also for their flesh.

**Kankakee'**, ILL., the county-seat of Kankakee co., on the Kankakee River and on the Illinois Central, the Cleveland, Cincinnati, Chicago & Saint Louis and other railroads. The city is in an agricultural region. The most important manufactures are agricultural implements, furniture, wagons, shoes and starch. There are also extensive limestone quarries and brick and tile yards in the vicinity. It is the seat of the Eastern Illinois Hospital for the Insane. Other fine buildings are the Arcade, the county jail, the opera house, the public library, a conservatory of music and the Y. M. C. A. building. Saint Viator's College, a prominent Roman Catholic divinity school, is located at Bourbonnais Grove, a suburb three miles distant. Kankakee was settled in 1853 and was incorporated the next year. Population in 1910, 13,986.

**Kansas**, the SUNFLOWER STATE, is located in the geographical center of the Union and is bounded on the n. by Nebraska, on the e. by the Missouri, on the s. by Oklahoma and on the w. by Colorado. With the exception of the northeast corner, where the boundary is formed by the Missouri River, the state is a rectangle. Its length from east to west is 400 miles, its width from north to south is 208 miles and its area is 82,158 square miles, of which 384 are water surface. Population in 1910, 1,690,949.

**SURFACE AND DRAINAGE.** The state occupies a portion of the great plain lying between the Rocky Mountains and the Mississippi River. As a whole it is an undulating prairie, rising at the rate of about 7½ feet per mile from the eastern to the western boundary. The average altitude of the eastern boundary is about 800 feet, and that of the western boundary is about 3500 feet. The highest point is in Sherman

County, on the extreme Western boundary, and is over 4400 feet in altitude. In general the surface of the state is characterized by low swells, separated by shallow valleys. Here and there are hills rising above this plain to the height of 400 or 500 feet and giving some variety to the scenery. The banks of streams in the eastern portion of the state are frequently characterized by bluffs on one side or the other, varying in altitude from 100 to 200 feet; but the streams in the western part of the state flow through shallow valleys and have low banks.

The Missouri drains the northeastern portion of the state. The Kansas and its tributaries flowing eastward drain all of the northern half of the state; the Arkansas, flowing eastward through a little more than half of the state and then bending southward; the Neosho and Verdigris flowing east of south, and the Mirais des Cygnes (Osage) flowing east, drain the remainder. Among the important tributaries of the Kansas River are the Republican, the Smoky Hill and the Solomon. The Verdigris flows into the Arkansas. The Missouri is navigable, but in general the streams are shallow and have but little fall, though a few have sufficient fall to afford some water power.

**CLIMATE.** Kansas has a temperate climate, mild, without tropic heat or arctic cold, and everywhere healthful. The atmosphere is clear and dry, and throughout the year there is a predominance of sunny days. The winters are short and mild, and but little snow falls. The mean annual temperature in the northern part of the state is about 50° and in the south about 55°. The mean rainfall for the entire state is about 27 inches, but it is much heavier in the eastern third than elsewhere. Here it exceeds 40 to 44 inches. In the central third of the state it is about 25 inches, and in the western third it is from 10 to 15 inches.

**MINERAL RESOURCES.** The southern counties contain extensive deposits of bituminous coal, which are worked in many places and yield a sufficient quantity of coal for all local purposes and for large shipments to other localities. There are also in this vicinity heavy deposits of lead ore and of zinc, the latter being extensively mined. To the northwest of the zinc and lead deposits is an extensive field of natural gas, and a little to the north and west of this are great deposits of petroleum, yielding about 1,000,000 barrels per year. Gypsum, limestone, chalk and large deposits of salt, clay and other minerals are scattered through the state and in many

localities appear in unlimited workable quantities. The output of salt amounts to about 2,000,000 barrels a year.

**AGRICULTURE.** Agriculture is the chief industry of the state. The soil is fertile, and the climate is well suited to growing all products that can be raised in a temperate climate. The only drawback to agriculture is the lack of rainfall in the western third of the state; however, the annual rainfall of this district is noticeably increasing. In the eastern third the chief crops are corn, oats, rye, potatoes, sorghum, broom corn, hay, hemp, flax and fruit. The central portion of the state is devoted to raising winter wheat, and in the production of this variety of wheat Kansas leads the other state of the Union. In this region are also found many thriving fruit orchards. Alfalfa is quite generally raised throughout the state, its total area being about 1,000,000 acres. The western third of the state is very generally devoted to the raising of live stock, for which it is abundantly suited, since there is sufficient moisture for grazing purposes and the mild winters allow stock to remain without shelter. The upper Arkansas valley, in the western part of the state, has considerable sugar-beet culture, principally in Finney and Kearny counties. Large numbers of cattle, horses and sheep are marketed from the state every year, and the wool clip exceeds 2,000,000 pounds.

**MANUFACTURES.** Compared with agriculture, manufacturing is of minor importance. The leading industries, in the order of their value, are slaughtering and meat-packing, with their chief center in Kansas City, Kansas; the manufacture of soap, butter, cheese and condensed milk; building and repairing cars and other rolling stock for large railroads; the manufacture of flour and other grist mill products, beet sugar, foundry and machine shop products. Other major industries include glass factories, brickyards and carriage factories.

**TRANSPORTATION AND COMMERCE.** The eastern and central portions of the state are well supplied with railway lines, and a number of trunk lines extend through the state from east to west, but in the western third there are few cross-lines connecting these, so that some portions of this part of the state (five counties) are without direct railway communication. Kansas City, Fort Scott, Wichita, Parsons, Coffeyville, Hutchinson and Topeka are important railway centers.

The commerce of the state is extensive and is



constantly growing. It consists of the export of livestock and packed meats, wool, zinc, lead, coal, salt, oil, fruit, wheat, flour, corn and other agricultural products, and the importation of manufactured goods and prepared foods.

**GOVERNMENT.** The legislature is composed of a senate, restricted to 40 members, and a house of representatives, restricted to 125 members. The senators are elected for four years, and the representatives for two years. The legislature meets biennially, and the members cannot draw pay for a session exceeding 50 days. The executive department of the government consists of the governor, the lieutenant-governor, the secretary of state, the auditor, the treasurer, the superintendent of public instruction, the attorney-general, the bureau of labor and industry, the superintendent of insurance and the secretary of horticulture, each elected for two years. There are also several administrative boards, such as the state board of agriculture, the board of railroad commissioners, the board of control of charitable institutions, the free employment bureau, the state board of health, the state tax commission and the bureau of mining industries. The governor, the secretary of state, the treasurer, the auditor, the superintendent of public instruction and the attorney-general constitute an executive council. The judiciary department is vested in a supreme court consisting of seven judges, elected for six years, and thirty-nine district judges, elected for four years, who preside over the courts in their respective districts. Each county has a probate judge and a clerk of the district court. The large cities have city courts, while townships, villages and cities have justice courts for the trying of petty cases.

**EDUCATION.** The state maintains an extensive system of generously supported public schools. The widely scattered rural population in the western part of the state is adopting the consolidated country school idea. The school fund is derived from the sale of school lands, two sections to each township, and is supplemented by local taxation. The public schools of the state are under the supervision of the superintendent of public instruction, and those in each county are under the supervision of the county superintendent. Cities of the first and second class are each under a city superintendent employed by the board of education of the city. The people throughout the state manifest deep interest in education, and advancement is constantly being made in all grades of

schools. The state university at Lawrence is at the head of the public school system, and graduates from high schools whose courses of study and work are approved by the university are admitted to that institution without examination. There is a state normal school at Emporia, with a branch school at Hays and another for industrial branches at Pittsburg. Graduates of schools of collegiate rank, accredited by the state board of education, are granted three years' state certificates. The state agricultural college and experiment station are at Manhattan, with an extensive branch of the station at Hays, to which belongs a farm of several thousand acres. The Agricultural College was established in 1863; it has 751 acres of land, and buildings and equipment worth \$755,000. It has 29 departments, an enrollment of 2500, a faculty of 170 members and a library of 37,000 volumes, worth \$60,000. Besides these there are numerous colleges and secondary schools maintained by religious denominations. Among those worthy of mention are Baker University at Baldwin (Methodist Episcopal), Saint John's College at Coinfield (Lutheran), Fairmount College at Wichita, Friends' University at Wichita, Southwest Kansas College at Winfield (Methodist Episcopal), Ottawa University at Ottawa (Baptist), College of Emporia at Emporia and the University of Kansas City and Western University (colored) at Kansas City.

**INSTITUTIONS.** The school for the deaf and dumb is at Olathe, and that for the blind is at Kansas City. There is a soldiers' orphans' home at Atchison and a national soldiers' home at Leavenworth. The state soldiers' home is located at Dodge City. The state penitentiary is at Lansing and the industrial reformatory is at Hutchinson. A Federal prison is near Leavenworth. The state also maintains an industrial school for girls at Beloit and an industrial reform school for boys at Topeka.

**CITIES.** The chief cities are Topeka, the capital; Kansas City, adjoining Kansas City, Mo.; Wichita, Leavenworth, Coffeyville, Atchison, Hutchinson, Pittsburg, Parsons, Lawrence, Independence, Fort Scott, Salina and Emporia.

**HISTORY.** Kansas was first visited by Spaniards under Coronado about 1541, but it was not again explored until the eighteenth century, when Frenchmen passed through it. It came into the possession of the United States in 1803 as part of the Louisiana Purchase, was explored by Lewis and Clark in the following year and by Pike two years later, and Fort Leavenworth

## Kansas

was established by the government in 1827. It was a part of the Territory of Missouri in 1821, but from that time until 1854 it was an unorganized territory. In that year occurred the great contest over organization, precipitated by the Kansas-Nebraska Bill. Several attempts to form constitutions and elect legislatures were made, and a lively contest ensued between immigrants from the South and from the North to gain control of the state. A pro-slavery party gained the first success in 1855, but in October of the same year a convention of free state men met at Topeka and adopted a constitution prohibiting slavery. An election was held under this instrument in January, 1856, and a free state governor was chosen, the pro-slavery party taking no part in the election. In 1856 occurred the famous raid of John Brown at Pottawatomie Creek (See BROWN, JOHN). With the aid of Federal troops the free state legislature was prevented from meeting, but a constitution adopted by the pro-slavery party at Lecompton, in November, 1857, was voted down. The immigration from free states thereafter became so preponderant that a constitution, adopted in 1859, prohibiting slavery, was finally ratified, and the state was admitted to the Union, Jan. 29, 1861. In the Civil War, Kansas contributed more than its quota of soldiers to the Union armies. After the war the state received a great impetus by the development of railroads. The principle of prohibition was incorporated in the Constitution after a long struggle, and the state has also taken advanced ground in opposition to railway and other trusts. In 1912 full suffrage was granted to women. Kansas has been uniformly Republican since the Civil War except in three state elections. Consult Spring's *Kansas*, in the American Commonwealths Series.

**Kansas, UNIVERSITY OF**, a state institution of learning, established at Lawrence, Kan., in 1864. The campus includes 170 acres, and the buildings number seventeen. The value of the buildings and equipment is \$1,335,000. The university comprises eight schools—a college of liberal arts; a graduate school; the department of law; the department of medicine; the department of pharmacy; the department of engineering, including electrical, mechanical, mining and chemical; the department of fine arts, and the University Geological Survey. The faculty numbers about 175, not including numerous lecturers of note; the enrollment is about 2600. The library has 70,000 volumes, and the natural history collection is worth \$200,000.

## Kansas-Nebraska Bill

**Kansas City, KAN.**, a city and the county-seat of Wyandotte co., on both sides of the Kansas River at its confluence with the Missouri, adjacent and connected with Kansas City, Mo., on the Missouri Pacific, the Union Pacific, the Atchison, Topeka & Santa Fé and the Chicago, Rock Island & Pacific railroads. Kansas City is the site of the state school for the blind and of the Kansas City University. It has a large and fine high school and a fine library building, costing \$75,000. The live stock interests are very important, and Kansas City, Kan., is the second largest live stock center in the United States. The industries include grain elevators, flour mills, railroad car and machine shops, manufactures of soap, foundry products and other articles. The city, known as Wyandotte, was chartered in 1886. Its recent growth has been very rapid. Population in 1910, 82,331.

**Kansas City, Mo.**, a city of Jackson co., at the junction of the Kansas and Missouri rivers, on the Chicago & Alton, the Atchison, Topeka & Santa Fé, the Chicago, Burlington & Quincy, the Chicago Great Western, the Chicago, Rock Island & Pacific, the Chicago, Milwaukee & Saint Paul and other railroads. Among the chief structures are the United States custom-house, the new union depot, the art gallery and museum, the city hall, the court-house and the office buildings of several life insurance companies. The charitable and educational institutions include the Kansas City School of Law, University Medical College, Scarritt Training School and several hospitals. The city is a very important commercial center. It is in the midst of a rich agricultural region, and its trade in grain and live stock is especially great. It is noted for its immense stockyards and packing houses. There are important manufactures of foundry and machine shop products, confectionery, clothing and malt liquors. It has a fine public school system, with four large high schools. The first settlement was made in 1821. In 1838 the town was laid out, and it was incorporated as a city in 1853. Population in 1910, 248,381.

**Kansas-Nebraska Bill**, a bill passed by the Congress of the United States in 1854 separating and organizing the territories of Kansas and Nebraska. It was introduced by Stephen A. Douglas. It was chiefly important as embodying the "squatter sovereignty" idea of Douglas, that is, as expressed by the bill, that "all questions pertaining to slavery in the territories and the new states to be formed therefrom, are to be



## Kansas River

left to the decision of the people residing therein, by their appropriate representatives." This provision would have overridden the Missouri Compromise, which prohibited slavery north of the latitude of 36° 30'. The original bill was superseded by another prepared by Douglas, which distinctly repealed the slavery clause of the Missouri Compromise. The bill passed the Senate against the opposition of Sumner, Chase, Everett, Seward and others, and it passed the House after a long and bitter struggle. It revived the bitter slavery contest which had been allayed by the Compromise of 1850, for it practically opened to slavery an area of 500,000 square miles, including the present states of Kansas, Nebraska, Montana, North Dakota, South Dakota, Wyoming and part of Colorado. It was immensely important in hastening the Civil War.

**Kansas River**, a river of Kansas, formed by the junction of the Republican and the Smoky Hill (the latter rising in the Rocky Mountains). It traverses the state in an easterly direction and falls into the Missouri near Kansas City. It is 250 miles long and is not important for navigation. Topeka, Lawrence and Junction City are on its banks.

**Kant**, *kahnt*, IMMANUEL (1724–1804), a celebrated German philosopher, born at Königsberg, Prussia. He was educated at the University of Königsberg, where he supported himself as a private tutor and later served as a lecturer until 1770, when he became professor of logic and metaphysics, a position which he held until old age. Kant's personal appearance and manner of living gave no suggestion of the strength of his influence. He was small of stature, being scarcely more than five feet tall, and lived a most methodical, unpretentious life. Although he was deeply interested in travels and in descriptions of the characteristics and customs of foreign nations, it is said that he was never outside the borders of the province in which he was born.

Kant attempted to reconcile the conflicting philosophical systems which had dominated the seventeenth and eighteenth centuries. In doing this, he constructed a new system, in which the contradictory theories were reconciled. Kant's greatest work, *The Critique of Pure Reason*, contains a complete exposition of his philosophy, and through it and other writings he exerted a more potent influence upon thought than any other man of his time. His other important works are *The Critique of Practical Reason* and *The Critique of the Power of Judgment*.

## Karlsruhe

**Ka'olin**, a name first given by the Chinese to a pure white clay used by them in the manufacture of porcelain. Kaolin is a product of the decomposition of granite rock, containing feldspar, mica and quartz. Similar clays, differing slightly in color and in the percentage of constituents, are found at Schneeberg in Saxony, furnishing the material of Dresden china; at Limoges, in France, employed for Limoges ware, and at Saint Austell, in Cornwall, the source of supply for the British potteries. In the United States kaolin is found in Nebraska, North Carolina, Delaware, Georgia, Pennsylvania, Connecticut and Vermont, but the best quality is obtained from Cornwall, England. In its natural state kaolin somewhat resembles mortar; by sorting and repeated filtration it is freed from all coarse ingredients, then dried in pans and sheds and sent into the market cut into blocks. When burned it becomes pure white. See POTTERY.

**Karakorum**, *kah'ra ko'rum*, **Mountains** or **Mustagh Mountains**, a mountain range in Central Asia, forming a sort of rampart between Kashmir and Eastern Turkestan. Mount Godwin-Austen, 28,278 feet in height, is, after Mount Everest, the highest mountain in the world, while the average elevation of the range is great.

**Karikal**, *ka re kahl'*, a French settlement in India, on the Coromandel coast, 150 mi. s. of Madras. It has an area of 63 square miles. The town carries on an extensive trade in rice. Population in 1911, 56,577.

**Karlsbad** or **Carlsbad**, *kahr'ls'baht*, (Charles's bath), a town of Bohemia, famous for its hot mineral springs, and much frequented by visitors from all parts of the world. The principal spring, the Sprudel, has a temperature of 165°. Sulphate of soda, carbonate of soda and common salt are found in these waters, which are valuable in cases of diabetes, gout and dyspepsia. Population in 1910, 15,500.

**Karlsruhe** or **Carlsruhe**, *kahr'ls'roo a*, (Charles's rest), the capital of the grand duchy of Baden, Germany, situated near the Rhine, 30 mi. n. w. of Stuttgart. The city is noted for its well-paved streets and for its excellent buildings and monuments. Among the important buildings are the palace of the grand duke, the Evangelical church, the Roman Catholic church, the court theater and the new palace of the crown prince. Besides a court library, which contains 100,000 volumes, there are also a large public library, several valuable museums

## Karnak

and art collections, a botanical garden and a school of forestry. The chief industries are the manufactories of locomotives, machinery, stoves, wagons, paper and stone ware. Karlsruhe dates its beginning from a hunting palace erected in 1715 by the margrave Karl Wilhelm. Population in 1910, 134,313.

**Karnak**, *kahr'nak*. See THEBES.

**Kaschau** or **Kassa**, *kah'show*, a city of Hungary, capital of the County Abauj-Torna, 170 mi. n. e. of Budapest. It is beautifully situated, surrounded by vineyards, and is one of the best-built towns in Hungary. The chief buildings are an old Gothic cathedral, Saint Michael's church, the townhall, the episcopal palace, a theater, the oldest in Hungary, and a royal law school. The manufactures include paper, spirits, flour, tobacco and wooden products. Population in 1910, 44,211.

**Kashgar**, *kahsh gahr'*, a city of central Asia, in Eastern Turkestan, on a river of the same name. It has considerable manufactures of cotton, linen, gold and silver cloth, and carpets, and is the center of an extensive trade. Population, estimated at from 60,000 to 70,000.

**Kashmir** or **Cashmere**, *kash meer'*, an extensive principality in the northwest of Hindustan, subject to a ruler belonging to the Sikh race. It is politically subordinate to the British Indian Empire. The area is estimated at 80,900 square miles. Kashmir proper, which forms a small portion of the whole, is a valley surrounded by mountains, the Himalaya and Hindu Kush, and traversed by the river Jhelum. There are ten chief passes through the mountains into this valley, varying in height from about 9000 to 12,000 feet. The elevated situation of the valley and the mountains of snow which surround it render the climate rather cold; but the region is well watered by streams and is very fertile. Forests on the slopes, fields of corn, rice crops along the sides of the rivers, rich orchards and an abundant growth of flowers distinguish the district. The common European fruits are grown, and attention is now being paid to the culture of the vine. The chief crops are wheat, barley, rice and Indian corn, and two harvests are reaped in the year. The chief manufacture is that of the celebrated Cashmere shawl. The capital of the whole principality is Jamoo. Srinagar, or Kashmir, is the maharajah's summer residence and is the largest town. This city was founded in the sixth century, coming under British protection in 1846. Population of the principality in 1911, 3,158,126.

## Kauffman

**Katah'din**, one of the prominent peaks of the Appalachian Mountains, situated in the northern part of Maine, the most prominent peak in the state. Its altitude is 5200 feet. It is located in the midst of a wilderness and is formed principally of granite. An extended view of the surrounding country can be obtained from its summit.

**Katrine**, *kat'rin*, LOCH, a picturesque and much frequented lake in Scotland, County of Perth, 5 mi. e. of Loch Lomond. It is 9½ miles long and 2 miles wide. The scene of Scott's *Lady of the Lake* is largely laid here. All around the lake are lofty mountains, and the scenery is very beautiful.

**Kat'tegat**. See CATTEGAT.

**Katydid**, a species of grasshopper, found in some parts of North America. The insect is about an inch long and of a pale green



KATYDID AND EGGS ON A LEAF

color. It is named from the noise made by rubbing the drum-like organs in the wing covers against each other.

**Kauffman**, *kowf'man*, ANGELICA (1741-1807), a German painter. At an early age she went to Italy to study, where she first attracted attention by her portraits. In 1763 she studied ancient art under Winckelman at Rome, but two years later went to England, where she was received with great favor. She was made one of the original members of the Royal Academy in 1769. After her marriage to Zucchi, a Venetian painter, she returned to Italy, where her house became the favorite resort for artists and scholars. Her works are marked by grace and charm, but lack vivacity. Among her historical paintings are *Mother of the Gracchi*, *Anna and Abra* and *The Sacrifice of Messalina*. Other works are *Death of Leonardo da Vinci* and the *Vestal Virgin*.



## Kaulbach

**Kaulbach**, *kowl'bahK*, WILHELM VON (1805–1874), one of the greatest of modern German painters. He studied at the art academy of Düsseldorf under Cornelius and subsequently succeeded in the Munich academy. His most ambitious pictures, with the exception of the *Madhouse*, are to be found in a series utilized in the decoration of the Berlin Museum depicting the progress of the human race in typical scenes from the great historic periods. This series comprises the *Tower of Babel*, *Age of Homer*, *Destruction of Jerusalem*, *Battle of the Huns and Romans*, the *Crusades* and the *Reformation*. His works show strong power of characterization, and in some cases reveal the keen satire of the painter.

**Kaunitz**, *kow'nits*, WENZEL ANTON DOMINIK, Prince (1711–1794), an Austrian statesman, the great minister of Maria Theresa. His most famous service to Austria was the alliance which he concluded with France, the hereditary enemy of Austria, against Frederick the Great. His influence in the government declined under Joseph II and Leopold II, and in 1792 he retired.

**Kaw**, a tribe of Siouan indians which formerly lived near the mouth of the Kansas River, though now the small remnant of them are with the Osage on a reservation in Oklahoma.

**Kazan**, *ka zah'n'*, a city of European Russia, capital of the government of same name, situated on the Kazanka, about 4 mi. above its junction with the Volga, 430 mi. e. of Moscow. It is an extensive city and is strongly fortified. There are several mosques, a cathedral and several monuments. The university is a great seat of Oriental learning, with nearly 1000 students. The city has large wool-combing, weaving and dyeing establishments, tanneries and soap works, and a government dockyard is in the vicinity. The timber, flour and hemp fairs of Kazan are among the largest in the Russian Empire. Population in 1911, 188,100.

**Kean**, *keen*, CHARLES JOHN (1811–1868), an English actor, son of the celebrated Edmund Kean. He was educated at Eton. In 1830 he visited America, established his reputation as an actor and three years later appeared in *Othello* as Iago, his father having the rôle of Othello. He married the accomplished actress Ellen Tree in 1842, revisited the United States and later became sole lessee of the Princess Theater, London, where he put some of Shakespeare's plays on the stage with a splendor never before attempted. In 1868 he made a tour to

## Kearny

Australia, Jamaica, the United States and Canada, which proved very successful financially. On his return he continued to play in London and the provinces until a short time before his death. He inherited little of his father's genius, and his success was largely due to effective staging.

**Kean**, EDMUND (1787–1833), the most brilliant tragic actor of his age in England. His parents were poor and connected in a low capacity with the theatrical profession. At two years of age he was placed in a pantomime, at seven he went to school, but ran away, and for a short time he was cabin boy in a vessel. Returning to the stage, he ultimately obtained an engagement at one of the minor London theaters. For some years he played chiefly in small towns, and he managed to please his country audiences as Hamlet and Cato, and at Windsor he gained the applause of the royal family in *Richard III*. In 1814 he appeared at Drury Lane as Shylock and Richard III. His success was sudden and unexampled, and it was equally great in other parts, including *Othello*, *Hamlet*, *Macbeth*, *Iago* and *Lear*. He made two tours of the United States and was well received for his art, though criticised for unbusinesslike and discourteous personal conduct.

**Kearney**, *kahr'ny*, NEB., the county-seat of Buffalo co., 125 mi. w. of Lincoln, on the Chicago, Burlington & Quincy and the Union Pacific railroads. The important industrial establishments are large cotton and flour mills, grain elevators, brickyards, bicycle and cigar factories, foundries, machine shops and other works. The city is the seat of the state industrial school for boys, a military academy and a normal institute, and it has a public library, a fine high school, a city hall, a courthouse and an opera house. Other features of interest are a bridge across the Platte, over a mile long, and Lake Kearney, covering forty acres. The place was settled in 1871 and was incorporated as a village the next year. Population in 1910, 6202.

**Kearny**, N. J., a town in Hudson co., on the Passaic River, opposite Newark, and on the Erie and other railroads. It is a residence suburb of New York and Newark and has important manufactures of linoleum, thread, roofing, novelties and other products. A state soldiers' home, a Roman Catholic protectory and an Italian orphan asylum are located here. The place was settled by the Germans, who called it New Barbadoes. Later it was included within

## Kearny

the limits of Harrison, until it was separately incorporated in 1871. Population in 1910, 18,659.

**Kearny, PHILIP** (1815-1862), an American soldier, born in New York City. He graduated at Columbia College in 1833, studied law, entered the army in 1837 and two years later went to France to study the tactics of the French cavalry. While abroad, he served in the French army in the Algerian War, and in 1840 he was made aid to General Macomb, general in chief of the United States army, and was on the staff of General Scott, his successor, from 1841 to 1845. Kearny took an active part in the Mexican War, fought in an indian campaign in 1857, resigned, entered the French army and served with distinction in the Italian war, receiving the cross of the Legion of Honor, but returned to America in 1861. He reënlisted in the Union army and was killed at Chantilly in September, 1862.

**Kearsarge, keer sahrj',** THE. See ALABAMA, THE.

**Keats, keets, JOHN** (1795-1821), an English poet, born at Moorfields, London. From 1803 to 1810 he was at a school at Enfield, and at



JOHN KEATS

the close of that term he was apprenticed to a surgeon. Although he was a fairly good surgeon, he found the work very much against

## Keene

his inclinations, which were all toward the beautiful and fanciful, and he gave up the profession that he might devote himself to study, preparatory to a literary career. His first volume of poems came out in 1817; *Endymion* appeared in 1818; his last volume of poetry, containing *Lamia, Isabella, The Eve of Saint Agnes, Hyperion* and other poems, appeared in 1820. By this time he had become so ill of consumption that he was advised to seek a warmer climate; but it was too late, and though he reached Rome he survived only a short time. Shelley honored his memory by his elegy *Adonais*.

Keats's first volume of poems attracted little attention; the second, while it met with some favorable notice, was most severely criticised in *Blackwood's Magazine* and *The Quarterly Review*, and to the effects of this harsh treatment on a sensitive nature, Shelley in *Adonais* attributed Keats's early death. It is on his third volume that the fame of Keats rests, and the delicate, often faultless beauty of these poems entitles him to rank with the foremost of British poets. According to his conception, philosophy, politics, ethics had no place in poetry, which should concern itself merely with beauty. And the beauty to the worship of which Keats gave himself was not spiritual beauty, but the highest type of sense-impressions. In description of form, color, perfume, Keats has never been surpassed.

**Kecskemet, kech'ke mate,** one of the largest market towns of Hungary, 50 mi. s. e. of Budapest. It has an extensive trade in horses and cattle and is famous for its annual cattle fair. Population in 1910, 66,834.

**Kee'ley, LESLIE** (1836-1900), an American physician, born in Saint Lawrence County, N. Y., and educated at Rush Medical College, Chicago. During the Civil War he was an army surgeon. After this he located at Dwight, Ill., and during his practice he discovered a preparation for curing those addicted to the use of alcohol and opium. In 1880 he opened a sanitarium at Dwight for this purpose, and such was the success of this method that numerous other sanitariums were established throughout the Union. While his treatment was in many cases successful, its continuous use showed that it was not as effective as Doctor Keeley supposed it would be.

**Keene, N. H.,** the county-seat of Cheshire co., 43 mi. w. of Manchester, on the Ashuelot River and on two lines of the Boston & Maine railroad. The city contains railroad repair



## Keene

shops, sash and blind factories, furniture and other wooden-ware plants, a pottery, a shoe factory, a woolen-mill and other works. It is located on a plain surrounded by high hills. The place was settled in 1734 and was known as Upper Ashuelot until its incorporation under the present name, in 1753. The city was chartered in 1874. Population in 1910, 10,068.

**Keene, LAURA** (about 1820–1873), the stage name of an English-American actress whose real name was Miss Mary Moss. She first achieved success in London, in 1851, as Pauline in *The Lady of Lyons*. In the following year she visited the United States and Australia and in 1855 opened a theater in New York City. In 1858 she produced *Our American Cousin*, among the supporting actors being Joseph Jefferson and E. H. Sothorn. It was during the presentation of this play that President Lincoln was assassinated in Ford's Theater at Washington, in 1865.

**Keewatin, kee wah'tin**, formerly a district of Canada, later a part of the Northwest Territories, stretching from Manitoba to the Arctic Ocean and from Saskatchewan to Hudson Bay. The district was 1300 miles long and had an area of 756,000 square miles. The principal rivers are the Severn, the Nelson, and the Churchill. The southern portion contains dense and valuable forests of spruce, pine and aspen poplar. 178,100 square miles of the district were added to the province of Manitoba in 1912.

**Keller, HELEN ADAMS** (1880– ), an American writer. An attack of scarlet fever destroyed the senses of sight and hearing when she was but nineteen months old. When she was seven years old Miss Anna Sullivan was secured as her teacher, and the child's progress was extraordinary. She learned to read, write and talk with her fingers and finally to speak. She graduated from Radcliffe College in 1900. She has published *The Story of My Life*.

**Kellogg, CLARA LOUISE** (1842– ), an American soprano, born at Sumpterville, S. C. She was educated in New York, but made her début in London and appeared with great success in many tours of Europe and America.

**Kelp**, in commerce, the crude alkaline substance obtained by burning seaweeds, which themselves are known as kelp. When salt was dear, the bulk of soda used in soap making was obtained from kelp and barilla; but since soda can be more cheaply manufactured from salt, kelp burning has ceased to be a flourishing industry. Kelp is now chiefly used in the production of iodine and chloride of potassium.

## Kendall

**Kelvin, LORD.** See THOMSON, WILLIAM, Sir, Lord Kelvin.

**Kemble, FRANCES ANNE** (1809–1893), popularly known as Fanny Kemble, an English writer and actress, eldest daughter of Charles Kemble and niece of Mrs. Siddons. She was induced to appear on the stage in 1829 at Covent Garden as Juliet, and her success in this rôle was followed by successes as Portia and as Lady Teazle. Her trip to America in company with her father was also a splendid triumph. She returned to London in 1847, and from that time she resided alternately in America, England and on the Continent, appearing at intervals as a public reader. She wrote the tragedy *Francis the First*, *Records of a Girlhood* and *Poems*.

**Kemble, JOHN PHILIP** (1757–1823), an eminent English actor. Being intended for the church, he was sent to the Roman Catholic college of Douay, France; but, in spite of his parents' opposition, he selected the stage as a profession, made his first appearance at Drury Lane in 1783 and became at once popular. From 1801 to 1803 he made a most successful tour in France and Spain, and on his return to London he purchased a share in the Covent Garden Theater and made himself a splendid reputation in the characters of Julius Caesar, Hamlet, Macbeth, Riche-lieu and Coriolanus. He abandoned the stage in 1817 and received many tokens of esteem from his numerous admirers on that occasion. His acting was distinguished for dignity and precision, but lacked fire and pathos.

**Ken'dal, MRS.** (1849– ), the stage name of Mrs. Margaret (Madge) Robertson Grimston, a distinguished English actress. She was born of a theatrical family and in childhood took juvenile rôles. In 1865 she made her formal début as Ophelia. In 1869 she was married to W. H. Grimston (Mr. Kendal), with whom she afterward acted. She attained notable success in both Europe and America in Sardou's *Diplomacy*, Shakespeare's *As You Like It* and some lighter modern comedies.

**Ken'dall, AMOS** (1789–1869), an American politician, born at Dunstable, Mass. He graduated at Dartmouth in 1811, and several years afterward he was a tutor in the family of Henry Clay, in Kentucky. There he was admitted to the bar and became a warm supporter of Andrew Jackson, whose cause he espoused in the *Frankfort Argus*. After Jackson's election to the presidency, Kendall became one of the leading figures in the famous "Kitchen Cabinet" (See KITCHEN CABINET), and as such he did much to

## Kenesaw Mountain

shape the policies of the administration. He became postmaster-general in 1835 and retained the office through most of Van Buren's term. Later he edited several newspapers and finally invested with Samuel F. B. Morse in telegraph patents, which returned him a large fortune. In the last years of his life he devoted himself to philanthropy. He was a warm supporter of Lincoln during the war, but still wished to be known as a Jacksonian Democrat.

**Ken'esaw Mountains**, BATTLE OF, an important battle of the Civil War, fought near Marietta, Ga., June 27, 1864. General Sherman with a force of about 95,000 Federals had begun his march from Chattanooga to Atlanta and had compelled the Confederates, 60,000 strong, under Gen. Joseph E. Johnston, to retreat before him. The latter, however, had taken up a strong position on Kenesaw Mountain, and there successfully met the determined assault led by Logan and McCook, the latter being killed. The loss of the Confederates was 700, and that of the Federals, 3000. Soon after the battle, Sherman succeeded in turning Johnston's position and later retired still farther southward.

**Ken'ilworth**, a town of England, in Warwickshire, 4 mi. n. of Warwick. Kenilworth Castle, now a magnificent ivy-covered ruin, was founded in the reign of Henry I. The gorgeous entertainment given here in 1575 to Queen Elizabeth by the earl of Leicester, to whom the castle was presented, is familiar to all, from Scott's romance of *Kenilworth*. Population in 1911, about 4800.

**Ken'nan**, GEORGE (1845- ), an American traveler and writer, born at Norwalk, Ohio. He was educated in the common schools, studied telegraphy and became an operator on the lines of the Russo-American Telegraph Company in Kamtchatka and Siberia. He returned to the United States, but in 1870 continued his explorations in Russia. In 1885 and 1886 he investigated the convict and exile system of Siberia, making a journey of 15,000 miles. Later he embodied his experiences and conclusions in many magazine articles, books and lectures. He was expelled from Russia in 1901, while making further investigations. Kennan served as special war correspondent for New York papers during the Spanish-American and Russo-Japanese wars.

**Ken'nebec'**, a river of Maine, rises in Moosehead Lake and after a course of 150 miles, mostly in a southerly direction, empties into the Atlantic, 12 mi. below Bath. Its chief tributary is the

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Androscoggin. The Kennebec has falls at various points in its course, one being at Augusta, where a dam has been built. It is navigable for ships as far as Bath and for steamers to Hallowell, 40 miles. Along its banks are the cities of Bath, Augusta, Waterville and Hallowell.

**Keno'sha**, Wis., the county-seat of Kenosha co., 34 mi. s. of Milwaukee, on Lake Michigan and on the Chicago & Northwestern railroad. The city has a fine harbor, with an increasing trade, and the manufactures include flour, hosiery, leather, typewriters, lamps, carriages, furniture and various machine-shop products. It contains the Kemper Hall School and Simmons Memorial Library. The place was first incorporated in 1841. Population in 1910, 21,371.

**Kent**, JAMES (1763-1847), an eminent American jurist, born at Fredericksburg, N. Y. He was educated at Yale College, and was admitted to the bar in 1785. He became professor of law at Columbia College and rose to be chancellor of New York (1814-1823). His *Commentaries on American Law*, published between 1826 and 1830, at once became a standard work and have had a great influence upon American legal practice and legislative principles.

**Ken'ton**, OHIO, the county-seat of Hardin co., 55 mi. n. w. of Columbus, on the Scioto River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Erie and other railroads. The city is in a farming region and has lumbering interests and manufactures of iron, hardware, tools and other articles. There is a public library, and the other important buildings are the courthouse, the city hall, the county jail and the armory. The place was settled in 1833 and was incorporated in 1885. Population in 1910, 7185.

**Kenton**, SIMON (1755-1836), an American frontiersman and Indian fighter, born in Virginia of Scotch-Irish parentage. He received but a limited education and in 1771 went to the head waters of the Ohio, where he became an Indian trader. He attained distinction in the frontier warfare of Ohio and Kentucky, under Daniel Boone and George Rogers Clark, accompanying the latter upon his famous expedition to Kaskaskia in 1778. He was several times a prisoner among the Indians and suffered terrible tortures. At the end of the war he settled at Maysville, Ky., but took part in Wayne's campaign in 1793 and in the Indian campaign of the War of 1812.

**Kentuck'y**, the BLUEGRASS STATE, one of the central states, bounded on the n. by Illinois, Indiana and Ohio; on the n. e. by West Virginia;



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on the s. e. by Virginia; on the s. by Tennessee, and on the w. by Missouri and Illinois. The Ohio River forms the north boundary line, which is very irregular; the Big Sandy River separates the state from West Virginia. The greatest length from east to west is about 500 miles, and from north to south, about 180 miles. The area is 40,598 square miles, of which 417 square miles are water. Population in 1910, 2,289,905.

**SURFACE AND DRAINAGE.** The surface of the state as a whole is mainly a plateau having an average of about 800 feet above sea level. This plateau, however, is divided into a number of distinctly marked physical regions. The Cumberland Mountains run along most of the southeastern boundary. West of these and nearly parallel with them is the shorter range of Pine Mountains. Along the eastern border flows the Cumberland River, breaking through 960 feet above the sea. The highest peaks in these ranges attain an altitude of 4000 feet, and others range from 2000 to 3000 feet. Between these ranges lies the Cumberland Valley, having a length of 75 miles and a breadth of about 15 miles. The floor of this valley is from 1200 to 1500 feet above sea level. The combination of mountain and valley in this region forms some of the most beautiful scenery in the entire Appalachian Mountain system. The entire eastern part of the state north and west of Pine Mountain is diversified by hill and valley, giving a pleasing effect to the entire region. This portion of the state is quite heavily timbered with a number of varieties of hard wood. Descending across the state from the northeast to the southwest and bordering upon the region already described is a region diversified by numerous conical sandstone hills, which rise from 1200 to 1300 feet above sea level. The peculiar appearance of this region has caused it to be named the *Knobs*. The Knobs extend along the southern boundary near the central portion of the state for a number of miles, and another branch extends northerly and northwesterly to the Ohio River. Lying between the branches of the Knobs and extending from the most northerly point in the state somewhat more than half-way to the southern boundary, is the celebrated blue grass region. To the west of this is an area of slightly diversified country, underlaid with thick formations of limestone, in which are found Mammoth Cave, near the central part of the state (See MAMMOTH CAVE), and numerous other caverns of less note. To the west and north of a portion of the limestone region is

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found a hilly section, closely resembling in its appearance and structure the southern portion of Indiana and Illinois, and the southwestern part of the state also bears a very close resemblance to this region.

The general slope of the state is toward the north and northwest, and all of the rivers flow into the Ohio or the Mississippi. Some of these streams have worn deep channels through the hills and low mountains which they have crossed. A number of them are important because of their size. Passing from west to east, these rivers, in the order of their occurrence, are the Tennessee, the Cumberland, the Green, the Kentucky and the Licking. The Tennessee and the Cumberland are navigable across the state, and the Green, the Kentucky and the Licking are navigable through the lower parts of their courses: previous to the construction of railway lines they formed important outlets to the Ohio River. There are no lakes of importance.

**CLIMATE.** The climate of Kentucky is warm-temperate, equable and healthful. The mean annual temperature is about 55°. In summer the thermometer may reach 100°, and the average temperature for July is 78°. The winters are warm, having an average of 35°, and there is but little snow. The average rainfall is about 40 inches in the entire state.

**MINERAL RESOURCES.** The eastern and southeastern portions of the state are underlaid with coal measures, which have an area of about 9000 square miles and yield an excellent quality of bituminous coal. Another coal region having an area of about 4000 square miles is located in the northwestern part of the state and is a continuation of the coal fields of Illinois and Indiana. Though of smaller area than the eastern region, this produces a larger quantity of coal, due mainly to its greater transportation facilities. Iron ore is found in the coal regions, but it has not yet been extensively mined. Other minerals of some importance are natural gas, occurring in several counties, and petroleum, found in the south central part of the state. In 1905 a pipe line was laid from the Menifee County gas field to Lexington, through which natural gas is supplied in abundance to this city. Limestone, salt, and clay suitable for brick and tile and for pottery are found in various localities.

**AGRICULTURE.** The soil and climate of most regions are admirably adapted to agriculture. The counties along the Ohio engage quite extensively in raising fruit. The blue grass region is devoted to stock raising and has attained more

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than a national reputation for its fast horses and excellent breeds of cattle. Mules are also raised in large numbers for the southern market. The leading crops are tobacco, corn, wheat and hemp. Rye and potatoes are also important crops. In the production of tobacco Kentucky leads all other states, producing from one-third to one-half of the crop grown in the country.

**MANUFACTURES.** The manufacture of tobacco is the leading manufacturing industry. This is followed in importance by meat packing, the production of iron and steel, the manufacture of alcoholic and malt liquors, lumbering, manufacture of flour and grist mill products, and slight industries of lesser magnitude, including the manufacture of woolen and cotton goods, furniture, carriages and machinery. The manufacturing industries center in and about Louisville.

**TRANSPORTATION AND COMMERCE.** In most parts of the state the carriage roads are fairly good. The state contains over 3000 miles of railway, but it is too far south to receive benefit from the great east and west trunk lines. There are a number of lines extending across the state from north to south; these are connected by cross lines, and some of them contain spurs extending into the most fertile regions. A number of counties in the eastern part of the state and in the south central region are wholly without railway communication, and as a whole the railway lines are inadequate to the needs of the state. The Ohio and its largest tributaries, the Tennessee, the Cumberland, the Green and the Licking, furnish important waterways.

The state has but very little direct foreign commerce. The exports are hemp, flax, tobacco and live stock, while the imports consist of manufactured articles and various food products. Louisville is the chief commercial point.

**GOVERNMENT.** The legislature consists of a senate of 38 members, elected for four years, and a house of representatives of 100 members, elected for two years. The legislature meets biennially, and the session is limited to sixty legislative days. The executive department consists of the following officers: a governor, a lieutenant-governor, a treasurer, an auditor of public accounts, a commissioner of agriculture, labor and statistics, a secretary of state, an attorney-general and a superintendent of public instruction, each elected for a term of four years; they are ineligible for reelection at the succeeding term. The judicial department culminates in a supreme court, known as the

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court of appeals, comprising from five to seven judges, each elected from a district for a term of eight years. The lower courts are the circuit courts, county courts and justice courts. The circuit courts consist of courts in each district into which the state is divided, and they are presided over by a judge who is elected in the district for a term of six years. The local affairs are administered by county and magisterial district officers.

**EDUCATION.** Separate schools are provided for white and colored pupils. The larger towns and cities have excellent systems of graded schools and the county is the unit for rural school organization, management and support. There are two state normal schools, the Eastern at Richmond and the Western at Bowling Green. They are maintained for the instruction of white teachers. As one of the older states, Kentucky was unable to profit by public lands which have been so beneficial in aiding the school systems of newer states. The state college at Lexington, which includes the agricultural and mechanical college, is at the head of the public school system and admits pupils who have completed the prescribed school course. There is also a state normal school at Frankfort, which is devoted to the preparation of teachers for colored schools. These institutions are supplemented by numerous colleges and secondary schools maintained by various denominations. Among the most important of these are Transylvania University at Lexington, Berea College at Berea, Central University at Danville, Georgetown College at Georgetown and Williamsburg Institute at Williamsburg.

**INSTITUTIONS.** The state school for the blind is at Louisville, the school for the deaf is at Danville and the institution for feeble-minded children at Frankfort. The insane asylums are at Lexington, Hopkinsville and Anchorage, and the penitentiaries at Frankfort and Eddyville.

**CITIES.** The chief cities are Frankfort, the capital; Louisville, Covington, Newport, Lexington, Paducah, Owensboro, Henderson and Bowling Green, each of which is described under its title.

**HISTORY.** Kentucky was probably first visited by Dr. Thomas Walker in 1750, but it was not settled until 1774, when James Harrod planted a colony at Harrodsburg. Meanwhile, Daniel Boone had led exploring expeditions into the region and in 1775 established Boonesborough. Virginia claimed the territory until 1790, when the Virginia legislature passed an act allowing



## Kentucky and Virginia Resolutions

separation, and this was accepted by a convention of the citizens of Kentucky. For many years, however, a strong sentiment in favor of the creation of an independent state had been growing and had been fostered by a land company known as the Transylvania Company, headed by Richard Henderson. The state was admitted to the Union June 1, 1792, and Isaac Shelby was elected first governor. Kentucky took a prominent part in the War of 1812, her great leader, Henry Clay, being a conspicuous member of the war party. It also was honorably represented in the Mexican War. In the Civil War she at first attempted to maintain her neutrality, though slaves were held in the state and her inclinations were naturally with the South. The Union armies, however, soon were in possession, and the state was saved to the Union. It was the scene of important battles, including those of Mill Spring, Richmond and Perryville. Forty thousand Kentuckians fought for the Confederacy during the war. The state was Democratic in both national and state politics almost continuously after the Civil War. Consult N. S. Shaler's *Kentucky*.

**Kentucky and Virginia Resolutions**, a series of resolutions adopted by the Kentucky and Virginia legislatures in 1798 and 1799. Those adopted by Kentucky were nine in number, were probably written by Jefferson and contained radical denunciation of the Alien and Sedition Laws, besides a protest and warning against the assumption by the Federal government of powers belonging to the states. In 1799 the legislature passed a resolution declaring the right of a state to nullify any Federal law which it deemed unconstitutional.

The resolutions passed by the Virginia legislature in December, 1798, were eight in number, were probably written by James Madison and were much milder in their expression. However, they contained the same principles. The two sets of resolutions were sent to the executives of all the states, and replies were received from many. All were unfavorable to the principles expressed in the resolutions.

**Kentucky University**, an institution of higher learning at Lexington, Ky., founded at Georgetown in 1837. It comprises, besides the College of Liberal Arts and College of the Bible, the commercial college, and the medical department at Louisville. The attendance is about 1200, and the faculty numbers about seventy.

**Ke'okuk, IOWA**, one of the county-seats of Lee co., 160 mi. s. e. of Des Moines, on the

## Kepler's Laws

Mississippi River at the mouth of the Des Moines River, and on the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Wabash, the Toledo, Peoria & Western railroads and the interurban connecting the city with Hamilton and Warsaw, Illinois. The Keokuk Dam, the basis of the greatest hydro-electric power plant in the world, was formally dedicated in August, 1913. The dam is a mile long, from Keokuk, Iowa, to Hamilton, Illinois. The power plant, built at a cost of \$27,000,000, develops over 300,000 horsepower, besides allowing enough water to convert the Des Moines rapids, formerly an obstacle to navigation, into the placid Cooper Lake. The steamboat lock adjoining the dam is greater than any of those at Panama, having a higher lift and allowing two boats to pass abreast. The city contains lumber mills, powder works, canning and pickle factories, a poultry packing plant and stove, shoe and other factories. The surrounding region is a fertile agricultural section, and there is a valuable trade in farm products. The Indian chief Keokuk, after whom the place was named, is buried in Rand Park. The city has a national cemetery, a public library, a medical college and a large dental college. Keokuk was incorporated in 1848. Population in 1910, 14,008.

**Kepler, JOHANN** (1571-1630), a celebrated German mathematician and astronomer, friend and companion of Tycho Brahe. After the death of Tycho, Kepler continued his work alone and was appointed imperial mathematician and astronomer (See KEPLER'S LAWS). The latter part of his life was chiefly passed at Linz, as professor of mathematics. Kepler wrote much, but the work that has rendered him famous is his *New Astronomy, or Celestial Physics delivered in Commentaries on the Motions of Mars*.

**Kepler's Laws**, in astronomy, three laws discovered by Kepler, on which were founded Newton's discoveries, as well as the whole modern theory of the planets. They are:

(1) Every planet describes an ellipse, the sun occupying its focus.

(2) The radius vector of each planet (line joining the center of the sun with the center of the planet) sweeps over equal areas in equal times.

(3) The squares of the periodic times (the periods of complete revolution round the sun) of two planets are proportional to the cubes of their mean distances from the sun.

These laws enabled Newton to determine the laws of the attraction of gravitation.

## Kerosene

**Kerosene**, *ker o seen'*, an illuminating oil made by distilling crude petroleum. Kerosene has a strong, disagreeable odor and a slightly yellowish color. It is the most valuable product of petroleum and is extensively used for lighting houses and for cooking and heating purposes. The United States and Russia produce the largest quantities of kerosene. The name was first applied to oil distilled from coal in 1846. See PETROLEUM.

**Kes'trel** or **Windhover**, a species of falcon widely distributed over Europe, some parts of Asia and northern Africa. The kestrel is closely related to the American sparrowhawk, which it resembles in size, color and habits. The color is red above, buff and fawn beneath, everywhere marked with black, with bluish-gray feathers on the head and rump. The female is usually a rusty brown. The kestrel is a strong flyer and is able to hover over one spot for a long time, by means of the movement of its wings. When holding itself in this position it keeps its head to the wind, and because of this it is sometimes called the windhover. It feeds on mice and insects and can be trained to capture small birds. It occupies nests that have been deserted by crows and other birds, and it also builds in old towers and buildings.

**Ketch'up** or **Cat'sup**, said to be derived from the Japanese *kitjap*, a pungent sauce first introduced from the East and employed as a seasoning for gravies, meat and fish. It was formerly prepared from mushrooms only, but tomatoes, cucumbers and numerous other products are now used for the same purpose. The best ketchup is made from mushrooms and walnuts.

**Kew**, a small village in England, situated on the Thames,  $1\frac{1}{2}$  mi. n. e. of Richmond. It contains the most noted botanical gardens of England and possibly of the world. In connection with these are a number of conservatories, three museums and a winter garden.

**Kewanee**, *ke wah'nee*, ILL., a city in Henry co., 50 mi. n. w. of Peoria, on the Chicago, Burlington & Quincy railroad. It is in an agricultural region, has coal mines in the vicinity and has become an important manufacturing center. It is the seat of extensive iron works and manufactories of agricultural implements, steam heating apparatus, pumps, gloves, mittens and other articles. Population in 1910, 9307.

**Key**, *kee*, FRANCIS SCOTT (1780-1843), author of *The Star-spangled Banner*. He was born in Maryland, practiced law at Frederick City and at Washington and became district attorney for

## Key West

the District of Columbia. It was during the British invasion in 1814, at the attack on Baltimore, which he witnessed as a prisoner in an English man-of-war, that Key wrote the words which have kept his name alive.

**Keyes**, *keez*, ERASMUS DARWIN (1810-1895), an American soldier, born at Brimfield, Mass. He graduated at West Point in 1832, and from that time until the Civil War he was on garrison duty on the frontier. At the opening of the war he was made brigadier general of volunteers, took part in the first Battle of Bull Run and in the Peninsula Campaign, but resigned in 1864 and removed to California, where he entered upon a mercantile career.

**Key West**, FLA., the county-seat of Monroe co., on Key West Island, which is the most westerly of the Florida Keys, at the southern extremity of Florida, about 90 mi. n. by e. of Havana, Cuba. In 1912 a railroad to the mainland was opened for traffic. The harbor is defended by Fort Taylor, at the entrance, and there are two lighthouses. It is on a number of steamship lines and has a considerable trade in fish, fruit, vegetables, turtles, salt, tobacco and other goods. The manufacture



THE RAILROAD THAT GOES TO SEA  
Florida East Coast Railway extension to Key West.

of cigars, mostly by Cubans, is the principal industry, while sponge fishing is also of considerable importance. The city has a naval station, with docks, machine shops, a marine hospital and barracks. The principal educational institutions are the Methodist Seminary and the Holy Name Academy. Other interesting features are the courthouse, the Federal building, the city hall, a convent, the public library and the Martello towers. Key West was settled in 1822



## Khaibar Pass

and was chartered as a city ten years later. It was a place of considerable importance to the navy during the Civil War and also in the war with Spain. Population in 1910, 19,945.

**Khaibar**, *ki'bur*, **Pass**. See KHYBER PASS.

**Khamsin**, *kahm seen'*, the name of a warm wind, or sirocco, which blows over northern Africa in the early spring. The word means *fifty*, and this name is given the wind because it is usually of fifty days' duration. The kham-sin is a high, hot wind and often fills the air with dust. It follows the southward movement of the tropical belt of high barometric pressure.

**Khan**, *kahn*, a title given by Eastern nations to princes, commanders and governors. It is now generally reserved for governors of cities and provinces.

**Kharkov**, *kahr kofe'*, a city of Russia, capital of a government of the same name, located about 420 mi. s. w. of Moscow. Its most important institution is the university, which has about 1500 students. There are also various other educational institutions. The city has a large trade and has manufactures of cigars, tobacco, spirits and sugar. Population in 1909, 221,193.

**Khartum** or **Khartoum**, *kahr toom'*, the capital of Egyptian Sudan, on the left bank of the Blue Nile, near its junction with the White Nile, and on the Cape-to-Cairo railway. There are several mosques, Christian churches, government buildings and barracks here. Khartum is the emporium of a large trade, ivory, gums, ostrich feathers and senna being exchanged for European goods. Slaves are also bought and sold. It was made the seat of the governor-general of the Egyptian Sudan in 1850, and since that time it has grown in commercial importance. In 1885 it was taken by the Mahdi, who massacred the whole British garrison, including their gallant commander, General Gordon. In 1898 it was again captured by Lord Kitchener, who overthrew the Mahdi. Population in 1909, 18,235.

**Khedive**, the title borne by the ruler of Egypt. It is a Persian word, meaning prince or lord, and was adopted in 1867. In theory, the khedive is a viceroy of the sultan of Turkey, but in reality he is far more dependent on Great Britain, as an English adviser is present at council meetings and may veto any financial measure. The British protectorate was established in 1882 when Tewfik was restored to power.

**Khiva**, *ke'vah*, a khanate of central Asia, a vassal state of Russia, though it is practically independent. Its manufactures are unimpor-

## Kidnapping

tant. Trade is now being rapidly developed by Russian influence, especially by the Caspian-Bokhara railway. Population, estimated at 800,000. The capital, Khiva, lies on an alluvial flat at the junction of two canals, 50 mi. w. of the left bank of the Amu.

**Khyber Pass** or **Khaibar**, *ki'bur*, **Pass**, a famous pass in the northeast corner of Afghanistan, the chief gate between that country and India. The pass is 30 miles long, and though of considerable width in some places, it is in others not more than 20 feet wide. It is fortified and has been of great military importance during the various Afghan wars. It is under the control of the government of India.

**Kiao-Chau** or **Kiao-Chow**, *kyah'o chow'*, a walled city of China, situated on the south coast of the peninsula of Shan-tung and on the bay of the same name. In 1898 it was made the administrative center of the German protectorate in this part of China. Formerly it was a place of considerable commercial importance, but the filling up of its harbor transferred most of its trade to another port.

The murder of two German missionaries by Chinamen resulted in Germany's acquisition of Kiao-Chau under a 99-year lease. Kiao-Chau became the center of German trade in China, and also a powerful military and naval base. In 1914 Japan, as Great Britain's ally, demanded that Germany surrender Kiao-Chau, and on Germany's refusal to reply to this demand, began a siege. After a stubborn defense of three months, Kiao-Chau surrendered on November 6, 1914. Population in 1913, about 175,000, of whom less than 5,000 were Germans.

**Kidd**, WILLIAM (about 1650-1701), a celebrated pirate, known as Captain Kidd. He was originally a shipmaster of New York, and in 1696 he was appointed captain of the ship *Adventure*, of thirty guns, for the suppression of piracy. He collected about one hundred fifty recruits, sailed for the East Indies, took to pirating in the Indian Ocean and returned with his booty to New York in 1698. He was arrested and arraigned in England for piracy, but the charge could not be proven. He was, however, tried for the murder of one of his crew, sentenced and hanged. The myth that he buried immense treasure on the shores of Long Island Sound or the banks of the Hudson River gave rise to one of Edgar Allan Poe's tales, *The Gold-Bug*.

**Kid'napping**, the act of getting forcible and illegal possession of and carrying away a person; an offense of varied degree, but always punish-

## Kidneys

able by fine or imprisonment. The act may be committed against either children or adults, but must always be either against their will or with consent fraudulently obtained. In the case of children, valid consent in the sight of the law cannot be obtained.

**Kidneys**, *THE*, in man, two in number, are situated one on each side of the spinal column and extend downward from the eleventh rib. The right kidney is a little lower than the left, owing to the position of the liver. The kidneys are about 4 inches long,  $2\frac{1}{2}$  inches broad and  $1\frac{1}{2}$  inches thick, and each weighs about  $4\frac{1}{2}$  ounces. They are shaped somewhat like a bean, are reddish in color, are composed of a dense substance that is easily crumbled and are abundantly supplied with blood by the renal artery, a branch of the aorta. A corresponding renal vein carries the returning blood to the ascending vena cava. The function of the kidneys is to take the urea from the blood that circulates in the capillaries around them. The urea is made in the liver, and the health of a person depends upon its being carried out of the system. The urine is carried by the ureters to the bladder, where it is held until expelled from the body. For diseases of the kidneys see BRIGHT'S DISEASE; CALCULUS; GOUT.

**Kieft**, *keeft*, WILLEM (?-1647), a Dutch colonial governor in America. He arrived in March, 1638, and immediately displayed a haughty and tyrannical spirit, which aroused the enmity of the people of New Netherlands. His cowardly and deceitful policy against the indians resulted in a war of extermination, the desolation of the colony and the massacre of hundreds of settlers. As a result he was obliged to admit the colonists to a share of the government, through a "council of twelve." In 1647 Kieft was superseded by Peter Stuyvesant and sailed for England, but the vessel was wrecked and Kieft was drowned.

**Kiel**, *keel*, a town of Prussia, in the Province of Schleswig-Holstein, 53 mi. n. n. e. of Hamburg. It is the most important naval station of the German Empire. The chief industry is shipbuilding, but Kiel has also iron foundries, engineering works, oil mills, tanning works and tobacco works. A great ship canal, 61 miles long, now connects the town with the Elbe (See KAISER WILHELM CANAL). Population in 1910, 211,627.

**Kieserite**, *kee'zur ite*, a sulphate of magnesia, obtained at Stassfurt and elsewhere and employed

## Kiln

as a source of Epsom salt, as well as in the manufacture of fertilizers. See EPSOM SALT.

**Kiev**, *ke'yef*, a city of Russia, capital of the government of the same name, situated on the Dnieper, 670 mi. s. of Petrograd. The city is divided into three parts—old Kiev; the commercial quarter, Podol, and the portion which contains the old fortifications, known as Petchersk. In the early years after the introduction of Christianity into Russia, the city was the center of the new religion, and it contains many notable old ecclesiastical buildings. It has manufactures of tobacco, paper, chemicals and hardware, but its chief industries are the refining of beet sugar and milling and distilling. It has a good harbor, and its trade is extensive. Population in 1909, 468,712.

**Kilauea**, *ke'lah oo a'ah*, an active volcano in the east of the island Hawaii, on the eastern slope of the great volcano Mauna Loa, 30 mi. s. w. of Hilo. It has an oval crater, 9 miles in circumference, with a lake of red and boiling lava at the bottom, over 100 feet below the crater's mouth. The great eruptions of Kilauea were in 1789, 1823, 1832, 1840 and 1868.

**Kilimanjaro**, *kil'e man jah'ro*, a double peaked, snowclad volcanic mountain in German East Africa. The two peaks are Kibo and Mawenzi. Kibo is the higher, measuring 19,710 feet, and Mawenzi is 17,570 feet high. Vegetation is found up to 14,000 feet, and forests reach to 11,000 feet. The first ascent of the mountain was made by Hans Meyer, in 1889.

**Killarney**, *kil lahr'ny*, a market town of Ireland, in the County of Kerry, 44 mi. w. n. w. of Cork, in the midst of beautiful scenery within a mile of the celebrated lakes to which it gives its name. These lakes, three in number, are interspersed with wooded islands, and the lofty banks are also richly wooded. They are popular summer resorts and are visited annually by many tourists. Population of town, 5500.

**Killdeer**, a variety of plover common in America, named from its plaintive cry. See PLOVER.

**Kiln**, *kil*, a structure of brick or stone, used for drying, baking, burning, annealing and calcining various substances and articles, such as corn, hops, malt, cement, limestone, iron ore, glass, bricks and pottery. The construction of kilns naturally varies with the special object for which they are designed, but the same principle is involved in all, that is, the generation of ample and regular heat with a small expenditure of fuel.



## Kilogram

**Kil'ogram**, a weight in the French or metric system, containing 1000 grams, or 2.2046 pounds. It is sometimes shortened to kilo.

**Kil'ogramme'ter**, a unit of measurement, expressing the mechanical work expended in raising a body whose weight is one kilogram through the vertical height of one meter (3.2809 feet). It is equal to 7.233 foot-pounds.

**Kil'ometer**, a unit of measurement in the metric system, equal to 1000 meters or 3280.8 feet, about five-eighths of a mile.

**Kilpat'rick**, HUGH JUDSON (1836-1881), an American soldier, born on a farm in New Jersey. He graduated from West Point in 1861 and took an active part in the Civil War as a cavalry leader, distinguishing himself particularly at the second Battle of Bull Run, at Gettysburg and with Sherman in his famous marches through Georgia and the Carolinas. He also achieved fame by a daring raid through Virginia in March, 1864. For his brilliant service he was promoted, through all grades, to be full major general in the regular army.

**Kimberley**, *kim'bur ly*, the capital of Griqualand West, Cape of Good Hope, and the center of the South African diamond fields (See DIAMOND). It is connected by rail with Port Elizabeth and Cape Town, and its commerce is rapidly increasing. Kimberley was the scene of a long siege in the South African War. Population in 1911, 29,519, of whom 13,656 were white.

**Kindergarten**, *kin'dur gahr'ten*, a school designed for the instruction of children between three and six years of age. The word means *child garden* and originated with the first school of this kind, which was established by Friedrich Froebel in 1840, in the village of Blankenburg, Prussia. Froebel's idea was to place the child amidst such surroundings as would assist in the right expression of every activity. His ideal school included a building fitted up into work rooms and play rooms, flower and vegetable gardens and suitable playgrounds.

The underlying principles of the kindergarten are to use every impulse, desire, hope, interest or purpose of the child in advancing his skill along all lines of self-activity; through play so to train the child that he will become familiar with the ordinary occupations of life; to teach the children to love one another and to be kind. These ends are secured by use of carefully selected objects, called *gifts*, and by songs and games. The gifts are eleven in number and were selected by Froebel with a view to giving expression to all of the child's different activities. They are

## Kindergarten

divided into five groups: (1) solids, (2) surfaces, (3) lines, (4) points, (5) construction material. The first gift consists of six colored balls about one and one-half inches in diameter, covered with different colored worsteds. The second gift is a wooden ball, a cylinder and a cube one and one-half inches in diameter. This is occasionally replaced by half-inch beads, stained in six colors. The third gift consists of eight wooden one-inch cubes, forming, when properly placed together, a two-inch cube. The fourth gift consists of eight wooden brick-shaped blocks, one-half by one by two inches, forming, when placed together, a two-inch cube. The fifth gift is twenty-seven one-inch cubes, three of which are bisected diagonally and three quadrisected diagonally. The sixth gift is twenty-seven wooden brick-shaped blocks, three being bisected lengthwise and six crosswise. The seventh gift consists of wooden tablets one inch in diameter. These consist of circles, half-circles, squares, half-squares, equilateral triangles, half-equilateral triangles and thirds of equilateral triangles. The eighth gift consists of sticks or splints from one to five inches long: the ninth gift is of wire rings, half-rings and quarter-rings of various lengths; the tenth is of natural objects containing points, such as pebbles, lintel seeds and the like. The eleventh consists of construction materials, such as softened peas, pellets of wax, cork cubes and sticks with sharpened ends. In addition to these gifts, material is supplied for occupations. The solid material consists of clay suitable for molding, sand, cardboard and wax. The surface material includes papers for folding into squares, oblongs, triangles and other forms, colored crayons and water colors. The linear material includes slats for basketry work; material for weaving, embroidering and for drawing; material for emphasizing points, such as beads, buttons, papers, and material for stringing and perforating. See KINDERGARTEN department in Vol. V.

The kindergarten is not a school for instruction, but one where all barriers between teacher and pupil are removed and where the greatest freedom prevails, though the activities of the children are so directed by the teacher as to secure the desired end. For best results, one teacher should not have charge of more than twenty children.

Kindergartens are now common throughout Germany, France, Switzerland, Austria, England, the United States, Canada, Argentina and some other South American countries. The work was

introduced systematically into the United States in 1870, and schools are now found in all large cities and many small ones, so that there are over 300,000 children receiving systematic kindergarten instruction. The Pratt Institute of New York, the Teachers' College, connected with Columbia University, the Workingman's Institute in New York and the Chicago Kindergarten College provide means for the thorough training of those who wish to engage in kindergarten work. The state normal schools in a number of states also maintain kindergarten departments and prepare kindergarten teachers. The American Froebel Union was organized in 1867 and included the kindergarten instructors of the United States. This organization continued to increase in numbers and in influence until, in 1885, it became the Kindergarten Department of the National Educational Association. See FROEBEL, FRIEDRICH. A list of books on kindergarten topics is given in Vol. V.

**Kinematics**, that part of mechanics which deals with motion, its direction, acceleration and velocity, without reference to mass or to the forces causing the motion. See DYNAMICS; ELASTICITY; FALLING BODIES; STATICS.

**Kinet'ic Theory of Gases.** See Gas.

**Kinet'oscope**, an instrument for reproducing movable pictures from photographs and projecting them upon a screen. The pattern in most common use consists of a magic lantern with a strong light and an object glass and shutter, constructed specially for the pictures used. The pictures are photographs about an inch in diameter, arranged in succession on a long strip of celluloid film. This is attached to a rotating apparatus, which is operated by an electric motor or a belt and pulley and is unwound from one cylinder and wound upon another in such a manner as to cause the pictures to pass rapidly across the lens of the lantern. Each picture is exposed to view for about one-fiftieth of a second, and from fifty to sixty exposures a second are made. The opening shutter comes opposite to each picture as it falls upon the screen and then moves so as to shut off the light as the picture is changed. The time required for changing from one picture to another is about one-tenth the time given to the exposure upon the screen; hence the pictures succeed one another so rapidly that the impression of the first remains upon the eye until the next appears, thus producing a very lifelike effect. The kinetoscope is also called *vitascope*. See MAGIC LANTERN.

**King**, the title of the supreme ruler of a tribe, nation or state. In the earliest times the king was absolute ruler and the source of all authority. He was considered the representative of God on earth, and his person was held sacred. But this conception of a king has gradually changed with the growth of the spirit of liberty, until most rulers are now restricted by constitutions; many are elective, that is, subject to removal by a body representing the citizens of a State. No king now holds supreme authority; he is only coördinate with the national legislature and the national courts. The kingship is hereditary in most States and generally descends to the oldest male heir, though in some countries it may fall to female descendants in the absence of male descendants. In European countries the king is usually subject to a certain qualification as to religious faith. Thus, in England the sovereign must be a Protestant, and in Austria-Hungary he must be a Roman Catholic. The old theory that a king can do no wrong still obtains in Europe, and, accordingly, responsibility for political action is usually placed in the hands of his ministers. The powers of the king in most European countries theoretically include appointment, military and naval command, the summoning, opening and adjourning of the parliament, the approval or disapproval of legislation, the direction of foreign affairs, the pardoning of criminals, the conferring of titles; but in reality most of these powers are delegated to the king's ministers.

**King**, CLARENCE (1842-1901), a noted American geologist and mining engineer, born at Newport, R. I., and educated at the Sheffield Scientific School, Yale. After graduation he became connected with the geological survey of California and gave most of his time during the next five years to the exploration of the high Sierras. He made the first survey of Yosemite Valley and discovered and named mounts Whitney and Tyndall. In 1867 he was placed in charge of the United States geological exploration of the fortieth parallel and gave five years to this work, which resulted in a complete geological and topographical cross section of the Rocky Mountains and Sierra Nevadas. In 1879 the geological surveys acting under the government were organized under one head and placed in charge of the department of the interior. Mr. King was made the first director. Among his writings are *The Age of the Earth* and *Systematic Geology*.

**King**, RUFUS (1755-1827), an American statesman, born at Scarboro, Maine. He graduated

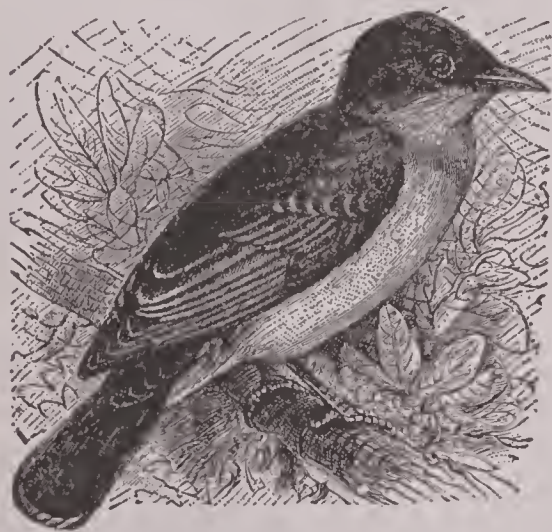


## King

from Harvard University and was admitted to the bar in 1780. He early entered politics, was elected to the legislature of the colony and was a delegate to the constitutional convention, being an earnest advocate of the instrument, especially in Massachusetts. In 1789 he was elected United States senator from New York and became a leader of the Federalists. In 1796 he was appointed minister to England, where he remained until 1803. He was twice thereafter elected to the United States Senate.

**King, WILLIAM RUFUS** (1786–1853), an American statesman, born in Sampson County, N. C. He was educated at the state university, was admitted to the bar and was elected to the state legislature in 1806. He was reelected in 1808 and in 1809 was sent to Congress, serving seven years. In 1819 he removed to Alabama and became one of the new state's first United States senators, serving continuously until 1844, when he was appointed minister to France. Returning at his own request in 1846, in 1848 he again became United States senator and in 1852 was chosen vice-president of the United States on the Democratic ticket with Franklin Pierce; but he was unable to enter upon the duties of the office on account of illness, which soon after caused his death.

**Kingbird**, a common drab-colored bird with white under parts and a patch of bright red



KINGBIRD

feathers on the top of its head; this it raises as a crest when angry, but it is ordinarily concealed. The kingbird is one of the tyrant flycatchers and is an exceedingly active, pugnacious bird; it defends its nest with vigor and skill. It has very keen sight, and even when sitting on its nest it keeps a sharp lookout for insects and, leaving its charge for a moment, catches them quickly

## Kingfishers

on the wing. The kingbird is charged with eating bees and is consequently not favored by the bee raiser, though on the whole few birds are of greater assistance to the agriculturist. The eggs are smooth and white, spotted with brown. Other nearly related species are called by the same name. The great-crested flycatcher, a near relative, has a curious custom of weaving into its nest, wherever possible, one or more of the cast skins of snakes.

**King Crab.** See HORSESHOE CRAB.

**King'fishers**, a family of birds distinguished by their long, stoutly formed, four-sided bills, which are broad at the base and terminate in a fine, sharp point; short legs, strong feet and somewhat elongated toes. The common kingfisher of Great Britain has a greenish head, back and neck, spotted with blue, and a bright blue



BELTED KINGFISHER

over back and rump. Its throat is white, and the under surface of the body is pale brown. The kingfisher spends most of its time perched on the bough of a tree overhanging the bank of a river. From this place it watches for fish, and as soon as it sees one, it dives into the water, secures the fish with its feet and carries it to land, where it swallows it entire. This bird has long been recognized in poetry and is the subject of many superstitions. Many people believed that it laid its eggs in a nest and floated it out upon the sea, stilling the waves with its wings. It was then called the *haleyon* bird, and from its name beautiful days came to be known as *haleyon days*. In the United States the *belted kingfisher* is a bluish bird with white under parts, crossed over the breast with a bar of blue. In the female and young this blue band is bordered with chestnut. This bird nests at the end of a long tunnel, which the bird makes in the bank of a stream.

## King George's War

**King George's War.** See FRENCH AND INDIAN WARS.

**King'let**, a delicate little bird of the thrush family, olive-green above and yellowish below. Two species are common in the United States, the *golden-crowned kinglet*, which has a stripe of beautiful gold or orange through the middle of its head, and the *ruby-crowned kinglet*, which has a fiery red crest hidden by grayish feathers, except in moments of anger or excitement. Both are common in the Northern states during the period of migration, and the ruby-crowned kinglet is one of the sweetest of the spring songsters.

**King Philip** (?-1676) or Metacomet, son of Massasoit, chief of the Wampanoags. Though Massasoit was a steadfast friend of the whites, his son had become suspicious of them and planned an outbreak which for a long time filled the colonies with burnings and massacres. Finally Philip was defeated and driven hither and thither; having taken refuge in a swamp near Mount Hope, he was slain by another Indian.

**Kings**, BOOKS OF, two books in the English and one book in the Hebrew canon of the Old Testament. The history, as related in the books of *Kings*, begins with the close of David's reign and carries the events onward to the capture of Jerusalem and the destruction of the Temple. See CHRONICLES.

**King's Evil.** See SCROFULA.

**Kings'ley**, CHARLES (1819-1875), an English clergyman and author. He was educated at King's College, London, and afterward at Magdalen College, Cambridge, where he took his degree with high honors. Shortly after his graduation he was given the curacy of Eversley, and he was later made rector of the same parish. The condition of the English working people always interested Kingsley greatly, and he worked constantly for their improvement, both spiritually and materially. His opinions on the social and economic questions of the time are powerfully expressed in his earliest novels, *Alton Locke*, *Tailor and Poet* and *Yeast*, *A Problem*. In 1853 *Hypatia* was published, and in 1855 *Westward Ho*, both brilliant historical novels, the former dealing with the early Christian church, the latter with the South American adventures of the Elizabethan era. Among his other well-known works are *Two Years Ago*, *Hereward*, *The Hermits* and *The Water Babies*. He was appointed professor of modern history at Cambridge in 1859 and was canon of Chester in 1869.

## Kingston

**Kingsley**, HENRY (1830-1876), an English novelist, a brother of Charles Kingsley. Educated at King's College, London, and Worcester College, Oxford, he left England to become an Australian colonist, in 1858. On his return he contributed largely to magazines and reviews. Of the novels which he published between 1859 and 1874 *Geoffrey Hamlyn* was the first, while *Ravenshoe* and *Austin Elliott* are considered the best. He was also for a short time editor of the *Edinburgh Daily Review*.

**Kings'mill Group.** See GILBERT ISLANDS.

**King's Mountain**, BATTLE OF, a battle in the Revolutionary War, fought October 7, 1780, between a detachment of Cornwallis's army, under Ferguson, and a force of backwoodsmen, under a number of partisan leaders, including James Williams, Isaac Shelby and John Sevier. The British were posted at the summit of a steep mountain about a thousand feet in height, but the Americans stormed the position from all sides, inflicting a loss of nearly 400 men in killed and wounded and capturing the remainder of the British force. The American loss was 28 killed and 60 wounded.

**Kings'ton**, the capital of Frontenac co., Ontario, Can., on Navy Bay, at the northeast corner of Lake Ontario, 172 mi. s. w. of Montreal, on the Grand Trunk, the Kingston & Pembroke and the Bay of Quinte railroads. Queen's University and College, a collegiate institution belonging to the Presbyterians, a mechanics' institute, the Anglican and Roman Catholic cathedrals and a hospital are located here. About a mile west of the city is the Provincial penitentiary. Next to Quebec and Halifax, Kingston has the strongest fortifications in Canada. The trade is very considerable, and the harbor is accessible to ships of large size. There are breweries and manufactures of machinery, steam engines, cottons, leather and pianos. Shipbuilding is carried on extensively. There are mineral springs in the town and neighborhood, and the city is a popular summer resort. Kingston was founded in 1783, on the ground formerly occupied by Fort Frontenac. It was incorporated in 1838. Population in 1911, 18,815.

**Kingston**, a city and the capital of Jamaica, situated on the southeast coast. The harbor is 6 miles long by 2 miles wide and forms an excellent anchorage for vessels. On Jan. 14, 1907, the city was visited by an earthquake, which, with the fire that followed, caused a loss of 2000 lives and much property. Population, 46,542.



## Kingston

**Kingston**, N. Y., the county-seat of Ulster co., 55 mi. s. of Albany, on the Hudson River and on the New York, Ontario & Western, the Walkill Valley and West Shore railroads. The city is the center of a large trade in coal, stone, brick, lime, lumber and cement, the last of which is especially famous. Kingston and Ulster academies are located here, and the city has several libraries, Kingston Point Park and a railroad bridge 150 feet above tidewater. The Senate House is historically interesting as the early seat of the state legislature, when the city was for a time the capital of the state. The first settlement was made in 1652 by the Dutch and was called Esopus, from the neighboring Indians. It was a dependency of Fort Orange until organized as Wiltwyck in 1661. Three years later the English took control and changed the name to Kingston. The villages of Rondout and Wilbur were added in 1872, and the place was incorporated as a city. Population in 1910, 25,908.

**Kingston-upon-Hull.** See HULL.

**King William's War.** See FRENCH AND INDIAN WARS.

**King'wood**, a beautiful, dark-colored wood, sometimes variegated with violet streaks, which closely resembles West Indian rosewood. It is used for small cabinet work.

**Kinkajou**, *kin'ka joo*, a carnivorous mammal of northern South America, related to the raccoon. In habits it is nocturnal, and it is docile when captured. In shape it resembles the lemur, the legs being short, fur close and woolly and tail long and prehensile. Kinkajous feed chiefly on small animals, insects, birds and honey.

**Kio'to**, **Kyoto** or **Saikio**, a large city of Japan, on the island of Hondo, in an extensive plain, 230 mi. s. w. of Tokyo, with which it is connected by railway. It was formerly the special residence of the mikado and the seat of his court, and the chief buildings are the old imperial palace and the residence of the shogun. It is the center of religion, of learning and of artistic manufactures, such as carved ivory ornaments, lacquered ware, bronze ornaments, brocaded and embroidered silks, porcelain and cloisonné ware. Kioto has many good schools and an imperial university. Population in 1904, 380,568.

**Kiowa**, *ke'o wah*, a powerful and peculiar tribe of indians that seem distinct from any of the other families. They were hostile to the whites and, with the Comanches and Chinooks, were for many years among the most troublesome of the western indians. The remaining

## Kipling

Kiowas are now living outwardly like the whites.

**Kip'ling**, (JOSEPH) RUDYARD (1865- ), an English poet and writer of fiction. He was born at Bombay, India, but was sent to England to be educated and in 1878 entered the United Service College at Westward Ho. Many of the incidents of his life here were afterwards described in *Stalky & Co.* On his return to India he became sub-editor on the *Civil and Military Gazette* at Lahore, which position he



RUDYARD KIPLING

held until 1889. During this time there appeared in the *Gazette* many of his short stories and poems, which were afterwards collected and published in book form. In 1892 he went to the United States, and while there he married Miss Caroline Starr Balestier. In 1899 he traveled in South Africa, and on his return he settled in England. Kipling may be reckoned as one of the most forceful of modern fiction writers, on account of his vivid descriptions of life in India, his keen insight into nature and character and his well-nigh unfailing ability to grasp the telling points in whatever he seeks to describe. Of his long list of books, the following may be mentioned: *Departmental Ditties*, *Plain Tales from the Hills*, *Soldiers Three*, *The Phantom Rickshaw*, *Wee Willie Winkie* and *Other Stories*, *The Light that Failed*, the two *Jungle Books*, *The Day's Work*, *Captains Courageous*, *Kim*,



## Kirghiz

generally considered his greatest work, the *Just-So Stories*, *The Five Nations*, *Traffic and Discoveries*, *Puck of Pook's Hill*, *Actions and Reactions* and *Rewards and Fairies*. His versatility may be best seen by a comparison of the almost brutal realism of *Soldiers Three* and the stories in the collection known as *Many Inventions*, with the super-sensual, mystic atmosphere of *The Brushwood Boy*, or *They*.

**Kirghiz**, *kir geez'*, a wandering Mongol-Tartar race, numbering in its various branches about 3,000,000 and inhabiting the steppes that extend from the lower Volga and the Caspian Sea in the west to the Altai and Thian-Shan Mountains in the east, and from the Sea of Aral and the Syr Daria in the south to the Tobol and Irtysh on the north.

**Kirksville**, *kurks'vil*, Mo., the county-seat of Adair co., 204 mi. n. w. of Saint Louis, on the Wabash and the Quincy, Omaha & Kansas City railroads. The city has a considerable trade with the surrounding agricultural region and contains iron works and other factories. A state normal school and the American School of Osteopathy are located here. It was settled in 1840. Population in 1910, 6347.

**Kirkwood**, *kurk'wood*, SAMUEL JORDAN (1813-1894), an American politician and administrator, born in Hartford co., Md., educated at Washington, D. C. He went to Ohio in 1835, studied law, and was admitted to the bar in 1843. Twelve years later he removed to Iowa, where he engaged in manufacturing. He became conspicuous as a member of the new Republican party and in 1859 was elected governor of Iowa. He became known as one of the most faithful and efficient of the famous "war governors." At the close of the war he was elected to the United States Senate. In 1875 for the third time he was elected governor of the state and at the close of his term again entered the United States Senate. In 1881 he was made secretary of the interior by President Garfield.

**Kishinev**, *ke'she nyef*, a town of Russia, capital of the Government of Bessarabia, on the Byk, a tributary of the Dniester. In 1812 only a small town, it is now the seat of the civil and ecclesiastical authority, has many churches, schools, theaters and large markets for cattle and corn. Population in 1911, 123,100.

**Kitchen Cabinet**, a name applied to a group of men who, during Andrew Jackson's administrations as president, exercised a great influence upon the policy of the government, though they held no important offices. The

## Kite

chief members of this circle were Major William B. Lewis, Isaac Hill and Francis P. Blair, Sr.

**Kitch'ener**, HORATIO HERBERT, Earl Kitchener of Khartum, of the Vaal and of Aspsall (1850-1916), a British general, born at Crofter House, Bally Longford, in County Kerry, Ireland. He was educated at the Royal Military Academy in Woolwich and entered the army in 1871 as a lieutenant of engineers. Later he was rapidly promoted to commands with the British force in Egypt, being conspicuous in the expedition which vainly tried to keep open communication with General Gordon at Khartum.



EARL KITCHENER

In 1896 he began an active campaign for the recovery of the lost provinces of Upper Egypt, and the capture of Khartum in September, 1898, marked the successful close of a brilliant series of engagements. During the Boer War he was chief of staff to Lord Roberts, and when Roberts returned to England Kitchener became commander in chief. After the war he was commander in chief in India for seven years and in the Mediterranean only for a few months. From 1912 to 1914 he was consul-general in Egypt, and on August 5, 1914, one day after Great Britain had declared war on Germany, he became secretary of state for war, thus assuming supreme command of the army. See WAR OF THE NATIONS.

**Kite**, a bird of prey belonging to the family of falcons, but differing from the true falcons in having a somewhat long, forked tail, long wings, short legs and weak bill and talons. This peculiarity renders it the least formidable of the birds of prey. The American swallowtail



## Kites

kite is a beautiful bird with glossy black back, wings and tail, and white under parts.

**Kites** have been known since earliest times and in certain countries are still the chief amusement of the people. In Japan kites strong enough to lift a man were made six hundred years ago, in order to spy out the force of an enemy in times of war. Not only the youths of Japan but the adults, also, enter into kite-flying with great zest, and some of the kites themselves are beautiful and elaborate productions, decorated with the highest art. In China the kite-flyer often has a number of kites in the air at once, all attached to a common string, and the greatest skill and patience are nee-



KITE

essary to keep them separate or disentangle them when they have been blown together by a strong wind. Fish, butterflies, dragons and birds are imitated in kites by the skilful Chinese, and many of these peculiar forms have found their way into stores of the United States. In the United States, kite-flying is in some localities a favorite pastime of children, and since the invention of the box kite, it has become possible to fly them very successfully in restricted space. Even here, kite-flying is not altogether a pastime, for besides the scientific use of kites in meteorological observations, use is made of them in carrying messages, in photographing landscapes and, to a considerable extent, in advertising. It has become no uncommon thing to see over a large out-door assembly a number of kites bearing advertising banners on their strings. See **THE BOY'S WORKSHOP** in Vol. VI.

**Kit'tiwake**, a species of gull, found in great abundance in all the northern parts of the world, wherever the coast is high and rocky.

## Klondike

It is a small, snow-white bird, with pearly blue upper parts. It takes its name from its peculiar cry.

**Kit'tredge**, ALFRED B. (1861-1911), an American politician, born in Cheshire County, New Hampshire. He was educated at Yale University, graduated from the Yale Law School and was admitted to the bar in 1885. In the same year he removed to Sioux Falls, S. D., where he obtained a large law practice. He was elected to the state legislature in 1889, serving four years, and in 1901 was appointed United States senator. He was elected for a full term in 1903.

**Kiushiu**, *kyoo'shoo'*. See JAPAN.

**Klamath**, *klah'mat*, a fairly civilized indian tribe, who now live on their reservation, but who were once important in southern Oregon, where they held as slaves the captives they made in their warfare. See **MODOC**.

**Klausenburg**, *klow'zen boorK*, (Hungarian, *Kolozsvár*), an Hungarian town, the former capital of Transylvania and the present capital of the County of Klausenburg. It carries on an active trade and has manufactures of cigars, beet sugar, cloth and paper. It is the seat of a Reformed and a Unitarian superintendent and has several educational institutions of importance. The greater part of the inhabitants are Magyars. Population in 1910, 60,808.

**Klondike**, the region surrounding the Klondike Creek and its tributaries, in the Canadian Territory of Yukon. The Klondike placer mines are located in the beds and along the banks of the Bonanza, the El Dorado and other tributary streams and creeks of the Klondike. This district is just east of the Alaskan border line, 2200 miles from the mouth of the Yukon River. Gold was discovered here by G. W. Cormack, a native of Illinois, in August, 1896. The gold lies all the way through a frozen bed of muck, fine and coarse gravel, and is free in large grains and nuggets. The world at large learned of the rich Klondike mines in July, 1897, and before the middle of August, 6000 men were on their way to the Klondike district. Dawson City, which sprang up after the advent of the crowds of miners, is the chief trading post of the district (See **DAWSON**). It is estimated that over \$2,000,000 in gold was taken from the Klondike placer mines in 1897. Mining operations are seriously embarrassed by the short summer period, as the limit of outdoor work is about three months. Miners excavate pay dirt during the winter months and wash



## Kneipp

the dirt during summer. In 1902 a diminution in the supply of gold was noticeable. Several of the richest claims had been exhausted, and no compensating new fields were discovered.

**Kneipp**, *knipe*, SEBASTIAN (1821–1897), a German priest who is best known for the water-cure treatment which he advocated. One of his principles is that patients should walk barefooted in the snow in winter and on the wet grass in summer. Sunshine and settled routine of exercise in the open air are important factors in his system. Establishments of the Kneipp treatment are to be found in many cities of the world, including the principal ones in the United States.

**Knife**, *nife*, a tool used for cutting. A knife has a blade and a handle. These are usually made of two parts and joined. There are nearly as many kinds of knives as there are uses for them. Savages made knives of stone by hewing the edge very thin and giving the blade a rough point. Bone, ivory and horn are used for paper knives, but table knives are made of steel or of bronze and plated with silver. Steel is used for the blades of knives that require a sharp edge. The pocket knife is a Yankee invention and was first made in Connecticut. A pen knife is a small pocket knife with a thin, narrow blade; it was so named because knives of this style were in general use for making quill pens before steel pens became common (See **PEN**). In sharpening a knife, both sides of the blade should be ground alike, and in using it, generally the edge should be turned so as to whittle from the holder. The best results are obtained by drawing the blade slowly toward the point as it is pushed forward through the wood.

**Knight**, *nite*. See **CHIVALRY**.

**Knight'hood**, **ORDERS OF**, the name given to organized and duly constituted bodies of knights. The orders of knighthood are of two classes—associations or fraternities possessing property and rights of their own as independent bodies; and merely honorary associations, established by sovereigns within their respective dominions. To the former class belonged the three celebrated religious orders founded during the Crusades—Templars, Hospitalers and Teutonic Knights. (For further details see **HOSPITAL**; **TEUTONIC KNIGHTS**; **TEMPLERS**). The other class embraces most of the existing European orders, such as the Order of the Golden Fleece, the Order of the Holy Ghost, the Order of Saint Michael. The chief British orders are the orders of the Garter, the Thistle, Saint

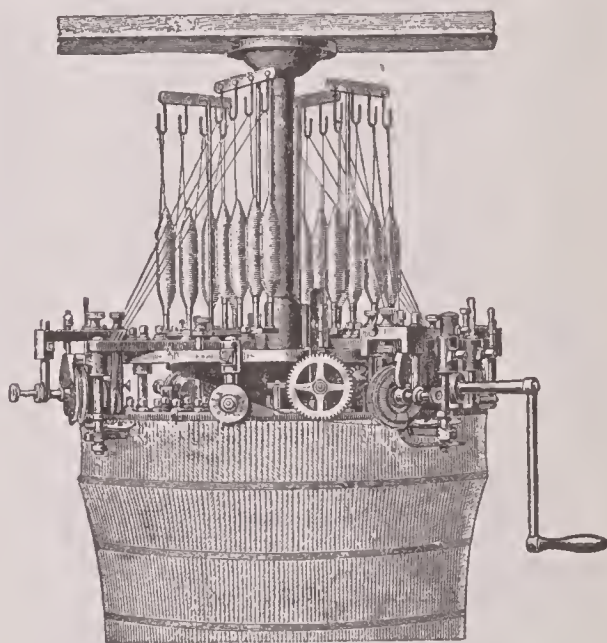
## Knitting Machine

Patrick, the Bath, Saint Michael and Saint George, the Star of India and of the Indian Empire. The various orders have each their appropriate insignia, which generally include a badge or jewel, a collar, a ribbon of a certain color and a star.

**Knights Hos'pitalers of Saint John**. See **JOHN**, **KNIGHTS OF SAINT**.

**Knights of Labor**, a labor organization founded at Philadelphia in 1869. Its operations were secret, but its professed object was the amelioration and protection of the laboring classes. Of late years the membership has largely decreased through internal dissensions and ill-advised strikes, and it has been largely superseded by the American Federation of Labor.

**Knitting Machine**. The first knitting machine was the stocking frame, invented by William Lee of England, in 1589. An improved form of this machine was introduced into the



KNITTING MACHINE

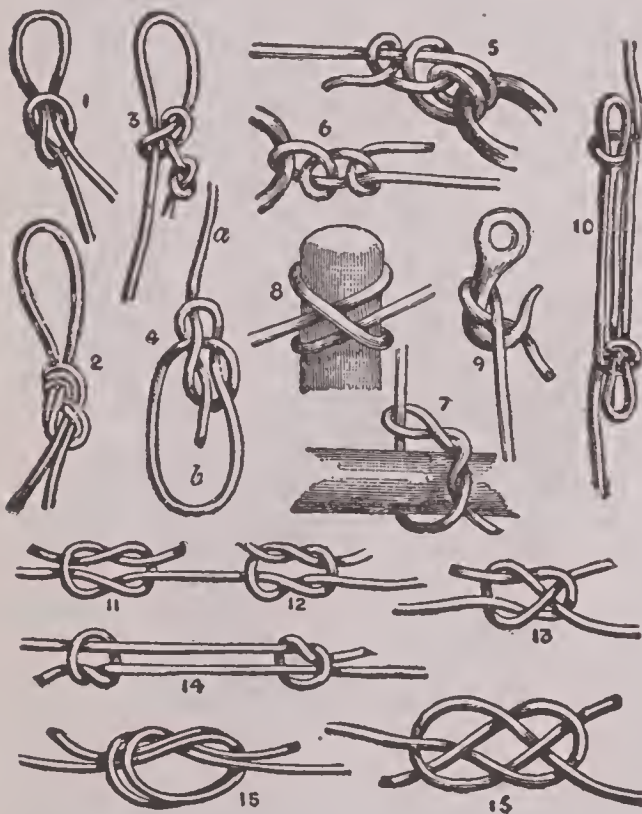
United States early in the eighteenth century, and power was first applied to the knitting machine at Albany, N. Y., in 1831. The most common form of knitting machine now in use is the circular, or rotary, machine, which knits a circular web. The needles are arranged in rows around a horizontal circular frame. Each needle has a hook at the end, by means of which it draws down the thread and makes a loop as it is depressed. When the needles are again elevated the loop is slipped off over this hook and forms a part of the web as the next hook is joined to it. The needles are upright and have an upward and downward motion, produced



by means of cams on the side. The web extends downward within the circle and has a weight attached to its lower end to hold it in position. The machines are automatic and so perfectly adjusted that a boy can tend four of them. They are used extensively in the manufacture of hosiery and underwear.

**Knotgrass** or **Knotweed** or **Door-mat**, a very common plant of the buckwheat family, remarkable for its wide distribution. It is a much-branched herb, with trailing stems and knotted joints, that grows in a mat, pressed flat to the ground. The flowers are not easily seen, but are small and greenish and pink in color. Knotgrass is remarkable for its varied forms and for the persistence with which it grows in hard or trampled ground.

**Knots** include the various methods of tying, fastening and joining ropes or cords. From



one hundred fifty to two hundred different kinds of knots may be enumerated, mostly used on shipboard, though almost all occupations using ropes or cordage have special kinds of knots adapted to their different requirements. While the great majority of these are purely technical, there are a few so generally useful in the everyday occurrences of life that they may be briefly described. The figures represent the various knots before they are drawn taut, the better to show the method of tying. Generally, the requirements of a useful knot may be stated

to be that it should neither slip nor jam; that is, that while it holds without danger of slipping while the strain is on it, when slackened it should be easily untied again. The simplest knot is the common one tied on the end of a thread or cord to prevent its slipping. By passing a loop, instead of the end of the cord, the common slip knot (1) is formed; and a useful fixed loop is obtained by tying a simple knot, or the figure 8 knot (2), on the loop of a cord. One of the simplest and most useful running knots for a small cord is made by means of two simple knots (3). The most secure method of fastening a line to a bucket is the standing bowline (4); and a running bowline is formed by passing the end *a* through the loop *b*, thus making a running loop. Another good knot to make fast a bucket is the anchor bend (5). Out of the score or so of methods of fastening a boat's painter the one which will be found most useful is the well-known two half-hitches (6). The timber hitch (7) is useful for attaching a line to a spar or a stone, and the clove hitch (8) is invaluable for many purposes. It is very simple and cannot slip. A simple method of fastening a rope to a hook is the blackwall hitch (9), where the strain on the main rope jams the end so tightly against the hook that it cannot slip. There are many methods for shortening a rope temporarily, one of them being the sheep shank, the simplest form of which is shown in 10.

Of the methods for uniting the ends of two cords, the simplest and one of the most secure is the common reef knot (11), which must be carefully distinguished from the "granny" (12), which will jam if it does not slip; the reef knot will do neither. For very small cords or thread the best knot is the weavers' (13). The fisherman's knot is a very useful one for anglers and is formed by a simple knot in each cord being slipped over the other (14); when drawn taut it is very secure, and it is easily separated by pulling the short ends. A useful method of uniting large ropes is shown in 15; tie a simple knot on the end of one rope, and interlace the end of the other and draw taut. This tie may also be made with the figure 8 knot. For very large ropes the carrick bend (16) is the simplest and most secure. The bowline bend is formed by looping two bowline knots into each other. See **SPLICING**.

**Knowles**, *nohlz*, JAMES SHERIDAN (1784-1862), a British dramatist. He tried acting for a time, but meeting with indifferent success, he devoted himself to teaching, first in Belfast

## Know-Nothings

and afterward in Glasgow. His tragedy of *Caius Gracchus* was performed in 1815 with success, and from this time he had a prosperous career as author, actor and lecturer. Among his best plays are *Virginus*, *The Wife*, *The Hunchback* and *The Love Chase*. About 1845 he retired from the stage. He afterward became a Baptist preacher and published several theological works.

**Know'-Nothings**, the popular name for the American party, which was formed in the United States shortly before 1855. The party gained considerable success in that year, lost its ground hopelessly in 1856 and soon after disappeared from American politics. Its distinctive principle was that the government of America must be in the hands of Americans; naturalization was to follow only after twenty-one years' probation, and allegiance to any foreign potentate or power was to be a bar to selection for political office. The term *Know-Nothings* was applied to them because they refused to tell anything that transpired at their meetings.

**Knox**, *noks*, HENRY (1750-1806), an American revolutionary soldier, born in Boston. At an early age he entered on a military career, and he took an active part in the contests immediately preceding the revolution. He took part in the battles of Bunker Hill, Brandywine, Germantown, Monmouth, Trenton and Yorktown; was for a time a member of Washington's staff, and was appointed by Washington to receive the surrender of the British forces in New York State. In 1785 he was appointed secretary of war, and he held the office for ten years. His bravery, skill and constant loyalty to Washington made him one of the commander in chief's most trusted friends.

**Knox**, JOHN (1505-1572), the chief promoter of the Reformation in Scotland, was born in Gifford, in East Lothian. He was educated in Glasgow and at Saint Andrews, became an ardent advocate of the reform faith in about 1542 and four or five years later preached to the beleaguered Protestants in the castle of Saint Andrews. When this castle was taken by the French, Knox was sent to France with the other prisoners and put to the galleys, from which he was released in 1549. Two years later he was appointed chaplain to Edward VI and preached before him at Westminster. On the accession of Mary in 1554, Knox left England and sought refuge at Geneva. Here he was soon involved in a controversy and, after a few months, re-

## Knoxville

turned to England, but again went back to Geneva the following year at the request of the congregation which he had left there. In May, 1559, Knox returned to Scotland and joined the lords of the congregation. He preached at Perth with such fire and effect that his hearers made a general attack upon the churches of the city, overturned the altars, destroyed the pictures, broke the images and almost leveled the monasteries to the ground. He was appointed minister of Edinburgh, and from that time until his death he took a leading part in the proceedings of the Protestants and had the principal share of the work in drawing up the confession of faith which was accepted in 1560 by Parliament. The next year he was involved in a sharp controversy with Mary Stuart, because of her attempt to reestablish the Catholic form of worship in Scotland. In 1569 he retired for a time to Saint Andrews, and three years later his health gave way. He married Margery Bowes in 1555. Besides preaching, Knox wrote extensively. Among his works are the *First Blast of the Trumpet against the Monstrous Regiment of Women* and the *History of the Reformation of Religion within the Realm of Scotland*. The best edition of his works is that edited by David Laing. Consult M'Crie's *Life of Knox*.

**Knox**, PHILANDER CHASE (1853- ), an American lawyer and statesman, born in Brownsville, Pa. He graduated from Mount Union College, Alliance, Ohio, in 1872, was admitted to the bar three years later and with the exception of one year, in which he was assistant United States district attorney, was engaged in active practice in his native city until 1901, when he was appointed attorney-general by President McKinley. This position he retained until June, 1904, when he resigned to accept an appointment to the United States Senate, as successor of M. S. Quay. From 1909 to 1913 he was secretary of state in President Taft's cabinet.

**Knoxville**, TENN., the county-seat of Knox co., on the Louisville & Nashville, the Southern and the Knoxville, Sevierville & Eastern railroads. It is beautifully situated on the Tennessee River, in the heart of the valley of East Tennessee. The University of Tennessee, Knoxville College (for colored students), the State School for the Deaf and Dumb and the Eastern Hospital for the Insane are located here. Knoxville is an important jobbing and wholesale center for dry goods, hardware, groceries and coal, and has a large trade in marble, furniture and leather goods. It exports considerable



## Koala

quantities of agricultural products and contains manufactures of cotton and woolen goods, flour, wagons, plows, cars, furniture, trunks and other articles. The place was settled in 1787. It was the capital of the "Territory South of Ohio" from 1792 to 1796, and of the state from 1796 to 1811. It was occupied by General Burnside in 1863. West Knoxville and North Knoxville were annexed in 1898, and commission government adopted in 1911. Population in 1910, 36,346.

**Koala**, *ko ah'lah*, an Australian animal, somewhat resembling a small bear, hence, sometimes called the *native bear*. Its toes are divided into groups of two and three, in which it differs from all other quadrupeds. This arrangement adapts the koala to grasping and hanging from branches of trees. The koala is about two feet long and is covered with a woolly fur, which is short and gray. It is nocturnal in its habits and feeds on leaves, chiefly of the eucalyptus. Like the kangaroo, the female has a pouch on its abdomen, in which the young are carried.

**Kobe**, *ko'bay*, a seaport of Japan, adjoining Hiogo so closely as to form one town with it. It lies on the western shore of the bay of Osaka and is 22 miles from the city of Osaka. It has docks, railway shops and a shipyard. Its harbor is safe and deep, and it has direct steamship communication with China, Australia and various European and American ports. Among its manufactures, the chief is paper. Kobe is one of the ports opened by treaty to foreign commerce, and it is considered the most attractive of them. Its trade is more extensive than that of any of the other treaty ports. Population in 1908, 378,197.

**Koch**, *koK*, ROBERT (1843-1910), a noted German physician and bacteriologist, born at Clausthal, Hanover. He was educated at Göttingen, and he practiced for a number of years with great success. Doctor Koch became noted for his investigation of bacteria as a source of disease, and he was able to place bacteriology on a firm foundation as a science. In 1882 he discovered the germ which produces consumption, and the next year he was sent by his government to Egypt to investigate the cholera; there he discovered the bacillus which causes this disease. In 1890 he proposed the lymph treatment for consumption; but the treatment has not been entirely successful. Doctor Koch was a member of the medical faculty of the University of Berlin. See GERM THEORY OF DISEASE; CHOLERA; TUBERCULOSIS.

## Kola

**Koh-i-noor**, *ko e noor'*, or **Mountain of Light**, the name of the most celebrated diamond. According to legend, it was in possession of a ruler in India more than five thousand years ago. It first came into history in the fourteenth century, when it was brought to Delhi. At the sacking of this city in 1739 it was carried to Afghanistan, but was returned to India later,



ROBERT KOCH

and at the conquest of Punjab it came into possession of the British East India Company, by whom it was presented to the royal family of Great Britain, in whose possession it still remains. It has been reduced, by successive cuttings, from 793 to 106 carats, and it is now valued at \$600,000. See DIAMOND.

**Ko'komo**, IND., the county-seat of Howard co., on the Wildcat River and on the Lake Erie & Western, the Pittsburg, Cincinnati, Chicago & Saint Louis and other railroads. The city is in an agricultural region, but is principally engaged in manufacturing. Glass, pottery, paper, rubber goods and automobiles are the principal products. It has a number of churches, a beautiful park, a public library and a high school. Kokomo was settled in 1844 and was chartered as a city in 1855. Population in 1910, 17,010.

**Ko'la** or **Co'la**, a genus of plants native of western Africa. The fruit consists of two, sometimes more, separate pods, containing

## Kolmar

several seeds about the size of horse-chestnuts, which have been found to contain caffeine, the active principle of coffee and also the same active principle as cocoa, with less fatty matter.



KOLA

A drink prepared from them is largely used in tropical Africa and is said to have digestive, refreshing and invigorating properties. It has been introduced into this country.

**Kolmar**, *kole'mahr*. See COLMAR.

**Kongfutse**, *kong fute'see*. See CONFUCIUS.

**Kongo** or **Congo**, the largest, and, excepting the Nile, the longest, river in Africa, and one of the largest rivers of the world. It has various names along its course. It rises in the mountainous region between Tanganyika and Nyassa and flows southwest under the name of the Chambezi River, entering Lake Bangweolo, or Bemba. From here it is continued as the Lupata northward into Lake Moero. The outlet of this lake flowing north receives in its course the great Lualaba. The river has many tributaries, among which are the Aruwimi, the Ubanghi, the Sanga and the Kassai. About eighty miles below Stanley Falls it is joined by the Lomani, and a little east of this point it begins its great bend to the west. About three hundred miles from the mouth of the Kongo is Stanley Pool, an enlargement of the river. The total length is perhaps 3000 miles, of which about one-half is navigable. Navigation is free from the mouth for about ninety miles, where it is interrupted by cataracts and falls, and is free again between Stanley Pool and Stanley Falls. The chief towns on the river are Matadi, Boma and Banana.

## Kongo Free State

**Kongo Free State** or **Congo Free State**, an independent state in central Africa. It reaches the Atlantic at the mouth of the Kongo River by a narrow neck of land and extends inland so as to cover an immense area lying mainly south of the river. In 1876, under the organization of King Leopold II of Belgium, the International African Association was founded for the purpose of promoting the colonization and civilization of Africa. At the expense of Leopold, Henry M. Stanley was sent to prepare for the development of the resources of the Kongo region (See STANLEY, HENRY MORTON, Sir). The Kongo Free State was founded in 1884 under the auspices of the Kongo International Association, and recognition for this territory as an independent sovereignty was obtained from the European governments and the United States in 1885, by the act of the Congress of Berlin, which declared that the state was free and neutral, that the trade was open to all nations and that the slave trade was to be suppressed. Leopold was made the sovereign of the state. The central government is located at Brussels and comprises the king of Belgium and a secretary of state. The direct administration of the government is carried on at Boma by a governor-general. In 1890 the right was reserved to Belgium of annexing the Kongo Free State after ten years. In 1901 no change was made in the existing form of government, but in 1908, by virtue of authority vested in the King, the State was annexed to Belgium.

The Kongo is the chief river, and with its tributaries it drains a great part of the land. The climate is tropical, and the lowlands along the coast are unhealthful, but in the interior Europeans can live nearly as safely as in their home countries. Among the products grown are hemp, bananas, sugar cane, rubber trees, coffee, tobacco, corn and rice. The trade in rubber and ivory is very valuable. The commerce has been increasing rapidly; the trade is carried on chiefly with Belgium, Great Britain, Germany and Holland. The principal stations are Boma, the capital; Banana; Ndolo; Leopoldville, the probable future capital; Stanley Pool, Stanley Falls, and Matadi, the railway city. The communication between the interior and the Atlantic has been greatly facilitated by the construction of a railroad line between those places on the Kongo where navigation is impossible on account of the numerous rapids and falls in the river. The inhabitants are mostly of the Bantu race. The population has been estimated



## Königgrätz

at from 14,000,000 to 30,000,000; the number of Europeans, most of whom are Belgians, is about 2300. Consult Stanley's *The Congo and the Founding of Its Free State*.

**Königgrätz**, *kö'nig grayts*. See SADOWA, BATTLE OF.

**Königsberg**, *kö'nigs berK*, a fortified town of Prussia, capital of the Province of East Prussia, situated about 5 mi. from the mouth of the Pregel. There are a number of buildings of historical interest, among them the Schlosskirche, in which Frederiek I and William I were crowned. The university, founded in 1544, is attended by 800 or 900 students and has a library of 225,000 volumes, a zoölogical museum and other valuable collections. The manufactures of Königsberg are various, including machinery, pianos, tobacco and cigars. The chief trade is in grain, flax and hemp, timber, tea, petroleum and leather products. Population in 1910, 245,994.

**Koo'doo** or **Kudu**, the native name of a striped antelope of South Africa. The male is distinguished by its fine horns, nearly four feet long and beautifully twisted in a wide spiral. The koodoo is of a grayish-brown color, with a narrow white stripe along the back and eight or ten similar stripes down either side. It is about four feet in height and fully eight in length.



KOODOO

**Kootenay**, **Kootenai** or **Kutenai**, a small family of indian tribes who lived on the borderland between Montana and British Columbia and are now zealous Catholics, quite well civilized and living comfortably on their reservations. They have always been honest and good friends of the whites.

**Kootenay River**, a river of British Columbia, which rises in the Rocky Mountains and flows southward into the United States, passing through Montana and Idaho, and then reënters British Columbia, where it flows through Kootenay Lake and thence into the Columbia River. It is about 400 miles long, but only a small part of it is navigable, because of rapids.

**Koran**, *ko'ran* or *ko rahn'*, or **Alcoran** (the reading, or that which is to be read), the book containing the religious and moral code of the Mohammedans, by which, indeed, all their

## Kordofan

transactions, civil, legal and military, are regulated. According to the Mohammedan belief, the Koran was written from the beginning in golden rays on a gigantic tablet in the highest heavens, and portions were communicated by the angel Gabriel to Mohammed at intervals during twenty-three years. These portions were dictated by Mohammed to a scribe and kept for the use of his followers. After Mohammed's death, they were collected into a volume at the command of Mohammed's father-in-law and successor, Abu Bekr. This form of the Koran, however, was considered to contain erroneous readings, and in order to remove these Caliph Othman, in the thirtieth year of the Hejira (652 A. D.), caused a new copy to be made from the original fragments and then ordered all the old copies to be destroyed. The leading doctrine of the Koran is the Oneness of God, clearly laid down in the symbol of the Moslem, "God is God, and Mohammed is his prophet." To Christ—who is simply regarded as one of the prophets—Adam, Noah, Abraham, Moses and Mohammed, it assigns a place in the seventh or highest heaven, in the immediate presence of God. The doctrines of good and bad angels and of the resurrection and final judgment are fully set forth, and also God's mercy, which, instead of the merits or good works of a man, secures entrance into heaven. Idolatry and the deification of created beings are severely condemned. The Koran prescribes prayer five times a day with the face turned toward Mecca; fasting; alms, and the pilgrimage to Mecca and Mount Ararat, something similar to which had existed with most sects before Mohammed. Purification must precede prayer, and where water is not obtainable, dry dust or sand may be used. To give alms was always a particular trait of the Arabians, but Mohammed made it obligatory. The language is considered the purest Arabic. See MOHAMMEDANISM.

**Kordofan**, *kor do fahn'*, a country of Africa, in the Eastern Sudan, between Darfur and the White Nile. From 1821 to 1883 it formed one of the Sudanese provinces of Egypt, but at the latter date it was freed from Egyptian rule through the Mahdi's insurrection and has since been virtually independent. The surface is generally flat, and the soil, barren during the dry season, is covered with vegetation during the rainy season. The climate in the wet season, lasting from June to October, is extremely unhealthy; in the dry season, though healthful, it is intolerably hot. The principal articles

## Korea

of trade are mucilage and ostrich feathers. Cultivation is almost wholly confined to a species of millet. The inhabitants consist largely of negroes and Arabs. The chief town is El Obeid. Population, about 300,000.

**Kore'a** or **Corea**, a Japanese possession in Asia, lying between 125° and 129° 36' east longitude and 34° 40' and 43° north latitude. It is bounded on the n. by Manchuria, from which it is separated in part by the Yalu River, and it projects to the s. e. between the Japan Sea and is separated from Japan by Korea Strait. Its length is 560 miles and its area is 82,000 square miles, or a little less than that of Minnesota. The population in 1912 was 13,461,299.

A mountain range extends the entire length of the kingdom along or near the northwest and the eastern shore, and this contains peaks varying in height from 4000 to 8000 feet. To the south and west the land slopes gently to the coast. The mountains are well wooded, as is most of the northern part of the country. The southern and western sections are covered with a fertile soil, contain numerous streams and are in other ways well suited to agriculture. The climate in the north resembles that of China in the same latitude. The winters are somewhat severe and the summers warm. The climate of the southern part of the kingdom resembles that of Japan, being mild and equable. Everywhere there is sufficient rainfall for agricultural purposes.

The mineral resources include coal, found in the west central part; gold, which is obtained along the rivers in the north; copper, lead ore, and granite, limestone and other building stones. Mining has not been extensively developed, but parties from the United States, Germany and Great Britain have obtained concessions for gold mining, and the output is now about \$2,240,000 a year. Considerable copper is also exported, and coal is mined for local use. With the exception of the northern region, the entire kingdom is well suited to agricultural purposes, and agriculture forms the occupation of nearly all the inhabitants. In the north, crops are confined to barley, oats and millet, but in the central and southern regions rice, corn, wheat, cotton, tobacco, potatoes and vegetables are raised in large quantities. Rice is the most important food plant. Fruits thrive, but owing to the frequent rains they have little or no flavor. Cattle, hogs and goats are raised, and oxen are generally used for work animals, the horse being reserved for riding. The raising of sheep is

## Korea

forbidden by law. Until recently the inhabitants knew nothing of butter, cheese and milk, but since the introduction of cattle these are gradually coming into use. The manufactures are limited and are at present confined to the weaving of fabrics from hemp and grass, the manufacture of coarse cotton and silk cloth, mats, bamboo screens and inlaid ware, also the manufacture of paper of a peculiar quality, used by the natives in making hats, other articles of clothing and umbrellas. Formerly the Koreans were noted for their skill in those arts which now specially characterize the manufactures of the Chinese and Japanese, and it is supposed that these arts were introduced into Japan through Korea.

There are practically no good roads, and outside the seaports wheeled vehicles are unknown. Travel and transportation of commodities are by pack animals. The nobility travel by sedan chairs. A railway connecting Chemulpo with Seoul is in operation, and another from Seoul to Fusan, the southern seaport, is in the process of construction. The kingdom contains over 2000 miles of telegraph lines, and a postal system conforming to the regulations of the Postal Union is in operation. The commerce of the country is limited and is carried on chiefly with China and Japan, though the United States, Great Britain, Germany and France have commercial treaties with Korea and carry on a limited trade.

Korea was formerly an independent kingdom, but at the close of the Russo-Japanese War Japan decided to assume control over the foreign affairs of Korea, and in 1907 placed a Resident-General at Seoul, who was given authority to veto any acts of the monarch. On August 23, 1910, the emperor was formally deposed, and Korea was annexed to Japan.

Education is general and theoretically extends from the common schools to the university, but no state university has been established. There are various schools in which Japanese and other foreign languages are taught, and a number of mission schools are maintained.

The inhabitants are supposed to have sprung from the intermarriage of Chinese, Ainos and other races and are of Mongolian descent. They differ somewhat in size, appearance and habits from the Chinese on the one hand and the Japanese on the other. The women live in seclusion. Polygamy is not legally authorized, but it is practiced to a greater or less extent. In religion most of the people are



ancestor and spirit worshipers, and their worship includes very many curious superstitions.

**HISTORY.** Korea is supposed to have been founded about 1100 B. C., and about 100 B. C. it was annexed to the Chinese Empire and continued this relation for somewhat over a century, when the kingdom was divided into three principalities. This condition lasted for about 1000 years. In 960 A. D. one of these principalities gained its independence and absorbed the others, and for the next 300 years Korea existed as an independent kingdom. During this time the arts flourished, and Buddhism obtained a very strong hold upon the country. At about the beginning of the fifteenth century, however, there was a revolution. Buddhism was overthrown, and a new dynasty was established. In 1592 the country suffered an invasion from the Japanese, who overran the kingdom, but were finally driven out by the Chinese. This military assistance resulted in making Korea again tributary to China, under which condition it remained until 1894, when, at the close of the China-Japan War, it was again made independent, though subject to Japanese influence. In the war with Russia, Korea sustained such a relation to Japan as to make it practically a dependency of that country when the war closed. Consult Bishop's *Korea and Her Neighbors*.

**Korner**, *kör'nur*, KARL THEODOR (1791-1813), a German poet. He wrote the tragedies of *Rosamunde* and *Zriny* and a large number of dramas for the Theater Royal at Vienna, but he owes his fame to his celebrated patriotic lyrics.

**Kosciusko**, *kos e us'ko*, MOUNT, one of the highest mountain peaks in Australia, in the Australian Alps, in New South Wales, near the frontier of Victoria. It is 7340 feet high.

**Kosciusko** (Polish pronunciation, *kos choosh'-ko*), THADDEUS (1746-1817), a Polish patriot, a man of noble family. He was educated in the military school at Warsaw and was afterward sent, at the expense of the state, to complete his studies in France. He went to America (1776), where he attracted the notice of Washington, was appointed by him engineer, with the rank of colonel, and afterward general of brigade. He did not return to Europe till three years after the conclusion of the Peace of 1783. For some years after his return he lived in retirement, but after serving in his own country under Poniatowski, he was appointed in 1794 generalissimo of the insurgent forces and defeated the

Russians at Raclawice, near Cracow. At the battle of Maciejowice, however, his army was defeated, and he himself was wounded and taken prisoner. He remained in captivity for two years, but was liberated on the accession of Paul I of Russia, in 1796. After visiting England and America, he spent the remainder of his life chiefly in France. In 1817 he issued a letter of emancipation to his serfs.

**Kossuth**, *kosh'oot*, LOUIS (1802-1894), an Hungarian patriot. He studied law, in 1832 entered the upper house of the Diet as substitute for an absent member and acquired immediate influence. In 1841 he became editor of the *Pesth Journal*, an exceedingly liberal paper. During the Hungarian war for liberty he was chosen governor or dictator, but the intervention of Russia on the side of Austria rendered all the efforts of the Hungarians unavailing. Kossuth resigned, was succeeded by Görgey, and was kept as prisoner in Turkey, whither he had fled. He was released through the intervention of Great Britain and the United States, and on his visits to those countries met with an enthusiastic reception. When the settlement was effected between Austria and Hungary in 1867, he might have returned to Hungary, but he remained an exile until his death, which took place in Turin.

**Koto.** See NIGERIA.

**Koumis** or **Kumiss**, *koo'mis*, a preparation of milk, whether cow's, mare's, ass's or goat's, which is said to possess wonderful nutritive and digestive properties. In the United States it is made from cow's milk. It consists essentially of milk in which alcoholic fermentation has been developed. On the Asiatic steppes, where it has been long used as a beverage, it is made of mare's milk; but koumis of mare's milk or goat's milk has a somewhat unpleasant smell. Koumis is recommended by physicians in cases where the stomach will not retain food.

**Kov'no**, a town in Russian Poland, in the government of the same name, of which it is the capital. It is 506 miles southwest of Saint Petersburg, on the left bank of the Niemen. The chief manufactures are nails and beer. The population, a great part of which consists of Jews, was, in 1910, 87,986.

**Kra'cow.** See CRACOW.

**Kraft**, ADAM (?1440-1507), the most noted sculptor of the Nuremberg School in Germany. His first work of importance was executed when he was fifty years old. This was *The Seven Stations*, now found in the German Museum. Kraft is especially known for his

## Krakatoa

famous monuments and tombs, which are executed in wonderful architectural and sculptural designs. His greatest work is without doubt the *Tabernacle*, in the Church of Saint Lawrence. It is a pyramid more than sixty feet high and is especially beautiful for its splendor of ornamentation. Other works are *Tomb of the Schreyer Family*, *Tomb of the Rebeck Family* and the *Landauer Tomb*.

**Krakatoa**, *kra't'ka to'ah*, a small volcanic island, situated in the Sunda Strait, about equally distant from Java and Sumatra. There was no eruption of the volcano from 1680 to 1883, but in August of the latter year an eruption occurred which was one of the most violent in history. As the island is uninhabited, the eruption itself caused no deaths, but the gigantic sea waves which the disturbance generated caused great loss of life in the neighboring islands.

**Krapot'kin**, PETER ALEXEYEVITCH, Prince. See KROPOTKIN, PETER ALEXEYEVITCH, Prince.

**Krefeld**, *kra'felt*, or **Crefeld**, a town in Rhenish Prussia, in the Government of Düsseldorf, 34 mi. n. w. of Cologne. It is the principal locality in Prussia for the manufacture of silks, velvets and mixed silk goods. There are also manufactories of woolen, linen and cotton cloth, wax cloth, hosiery, soap, candles, paper, leather, chemical products and tobacco. Population in 1910, 129,412.

**Krem'lin**, the name used to denote the citadel of a Russian city. The most famous kremlin is that of Moscow, situated on the north bank of the river Moskva. It occupies a high triangular portion of land covering 100 acres and is surrounded by a wall one and a half miles long, with eighteen towers and five gates. Most of the buildings comprising the Kremlin were erected by Italian architects at the close of the fifteenth century, though the royal palace was built as late as 1831. Among the buildings are the cathedral, where every czar since Ivan IV has been crowned; the tower of Ivan the Great, with a gilt dome and thirty-four great bells; one of the largest arsenals in the world, museums, barracks and palaces. One of the remarkable curiosities of the Kremlin is the great czar bell, cast in 1733, measuring 60 feet in circumference and weighing almost 200 tons. See BELL.

**Kriegsspiel**, *kreeK'shpael*. See WAR GAME.

**Krish'na**, in Hindu mythology, one of the manifestations of Vishnu and the most popular deity in the Hindu pantheon. See VISHNU.

## Kruger

**Kris'tian'ia**. See CHRISTIANIA.

**Kronstadt** or **Cronstadt**, the most important naval station of Russia, situated 20 miles west of Petrograd, at the eastern end of the Gulf of Finland. It has three harbors, which will accommodate a thousand vessels and which are closed by ice during five months of the year. Kronstadt was founded by Peter the Great in 1710. The city has a naval school, government navy yards and cannon foundry, building yards and sawmills. Population in 1910, 66,624.

**Kropot'kin** or **Krapotkin**, PETER ALEXEYEVITCH, Prince (1842– ), a Russian geographer and anarchist, born at Moscow. Though destined by his father to life at court, he entered the army as a member of a Cossack regiment in 1862 and, being stationed in Siberia, made numerous valuable explorations there. The policy of the Russian government toward the prisoners in Siberia embittered Kropotkin, and it was not long before he had openly espoused the anarchist cause. His convictions upon social and political matters were confirmed by a visit to Finland. Soon after, he devoted himself to spreading anarchist doctrines in Russia, was imprisoned, escaped to England and finally reached Switzerland, where he continued his propaganda. In 1879 he began the publication of *Le Revolte*, the official organ of the anarchists at Geneva. Expelled from Switzerland, he continued his work in France and England, where he afterward resided. In 1900 he visited the United States. Among his principal works are *The Memoirs of a Revolutionist*, *Law and Authority*, *In Russian and French Prisons*, *The Orography of Asia*, *Modern Science and Anarchism*.

**Kruger**, *kroo'gur*, STEPHANUS JOEANNES PAULUS (1825–1904), a South African statesman, president of the South African Republic. In 1872 he became a member of the Executive Council of the African Republic, and when, five years later, the Transvaal was annexed to British territory, Kruger, as vice-president, strongly opposed the annexation. In 1883 he was elected president, and he was successively reelected in 1888, 1893 and 1898. President Kruger used all his powers and influence against British aggression, and in 1884 he succeeded in obtaining a considerable reduction in the suzerain powers claimed by Great Britain. He was also successful in defeating the Jameson raid in 1896. He believed that war with Great Britain was inevitable and had his country



## Krupp

equipped with arms and ammunition before the struggle began. When the British approached Pretoria in 1900, Kruger moved his capital eastward and in September crossed into the Portuguese possessions, whence he sailed for Europe in October. He made several attempts to secure the assistance of the European powers in putting an end to the war, but without avail, and he finally took up his residence at The Hague.

**Krupp**, FRIEDRICH ALFRED (1854–1902), known in Germany as the *Cannon King*. Upon the death of his father, he undertook the direction of the great Krupp works at Essen and vastly increased the capacity of the business. He invented a new bessemer steel, out of which he made rifles and cannons and a seamless tire for car wheels, and discovered a new method of hardening armor plate. At his death he was the richest man in the Empire. He was well known for his generous dealings with his employes, having built for them comfortable modern dwellings, each with its garden, and provided a pension fund of over \$4,000,000 for their benefit. The Krupp works cover over 150 acres. His daughter succeeded to his business.

**Kry'olite**. See CRYOLITE.

**Kryp'ton**, a gas resembling argon, existing in the atmosphere and obtained by distilling the heavier portion of liquid air. It is estimated that the atmosphere contains only one part in a million. Krypton boils at 151.7° below zero. When an electric spark is passed through it, it emits a yellowish-green light.

**Kubelik**, *koo'be leek*, JAN (1880– ), a Bohemian violinist. He received his early education under his father and entered Prague Conservatory when twelve years old. In 1898 he made his first public appearance and two years later made his début in Berlin and in London. Thereafter he made several tours of both Europe and America, where he created a furor by his remarkable technique, though his interpretative ability was not at first pronounced.

**Kublai Khan**, *koob'ly kahn'*, more properly, Khubilai Khan (1214–1294), a Mongol emperor who founded the twentieth Chinese dynasty, that of the Mongols of Yuen. In 1259 he succeeded his brother as grand khan of the Mongols, and in 1260 he conquered the whole of northern China, driving out the Tartar, or Kin, dynasty. Marco Polo, who lived at the court of this prince, describes the splendor of

## Kurdistan

his court and entertainments, his palaces and hunting expeditions, his revenues, his extraordinary paper currency and his elaborate system of posts. *Kublai Khan* is the title of a poetical fragment by Coleridge.

**Kudu**, *koo'doo*. See KOODOO.

**Ku'fic**. See CUFIC.

**Ku-Klux' Klan**, a secret society founded in the Southern states of the Union about 1866. Primarily, the object of the society was social improvement, but its political purpose was to intimidate negroes and those who were in favor of the government's reconstruction measures, and thus to prevent them from voting. It soon gained thousands of members, who operated under disguise and usually in the night. Many outrages and crimes were committed by them, and conflicts were frequent between the Ku-Klux Klan and the Loyal League, an organization of the same nature of opposite creed. In 1871 the government took active measures to break up the organization, and the Klan, having accomplished its purpose to a large extent, was soon disbanded. The organization never received the general support of the better element in the South.

**Kulu'ri**. See SALAMIS.

**Kumassie**, *koo mahs'see*, or **Coomassie**, the capital of Ashanti, in western Africa, about 150 mi. n. of Sekondi, on the Gulf of Guinea. It is connected with Sekondi by the government railroad. Kumassie was taken by the British in 1874 and again in 1896. Population in 1911, 8853.

**Kumiss**, *koo'mis*. See KOUMIS.

**Kumquat**, *kum'kwot*, a very small variety of orange tree, growing not above 6 feet high, whose fruit, of the size of a large gooseberry, is delicious and refreshing. It is a native of China and Japan, but has been introduced into Australia and the United States.

**Kurdistan**, *koor de stahn'*, an extensive territory of Western Asia, south of Armenia. It is a mountainous region, containing considerable forests of oak and other hard timber and also numerous pastures on which horned cattle, sheep and fine-haired goats are reared. There are in the valleys many fertile districts yielding rice, cotton, flax, fruits and gall nuts. The Kurds, to whom the territory owes its name, are not confined within its limits, but are found in considerable numbers eastward in Khorasan and over the hilly region of Mesopotamia, as far west as Aleppo and the Taurus. They are a stout, dark race, well formed, with dark hair,

## Kuropatkin

small eyes, wide mouth and a fierce look. On their own mountains they live as shepherds, cultivators of the soil, and bandits. Their language is a dialect of Persian, now much mixed with Arabic and Syriac; their religion is Moham-medanism. The Kurds owe but slight allegiance to either Turkey or Persia, living in tribes under their own chiefs, who commonly exact duties on the merchandise which passes over their territory.

**Kuropatkin**, *koo ro pah't'kin*, ALEXEI NIKO-LAYEVITCH (1848- ), a Russian general. He won distinction in the Russo-Turkish wars, gaining promotion from lieutenant to colonel; became lieutenant general in 1890, and minister of war in 1898. In 1904 he resigned to assume command of the Russian troops in the Japanese war, but before the close of the war he resigned the chief command. See RUSSO-JAPANESE WAR.

## Kyoto

**Kuro Sivo**, *koo'ro se'vo*, or **Japan' Cur'rent**, the name of a warm current in the North Pacific Ocean corresponding in position and direction to the Gulf Stream in the North Atlantic. It flows past Formosa, Japan, the Kuriles, the Aleutian Islands and thence bends southward to California. It is much inferior to the Gulf Stream in volume and is of a lower temperature. See CURRENTS, MARINE.

**Kutenai**, *koo'ten i*. See KOOTENAY.

**Ky'anite**, a mineral of the garnet family, found both massive and in regular crystals. Its prevailing color is blue, but of varying shades. The best specimens take a high polish and are used for table tops, ink stands, paper weights and other ornaments. Kyanite is found in the United States in Massachusetts, Connecticut, Delaware and Virginia, and in Europe in Switzerland, Tyrol and Bohemia.

**Kyo'to**. See KIOTO.





**L**, the twelfth letter of the English alphabet, derived in form from the Phoenician, through the Greek and Latin. *L* has only one sound in English, but is silent in a few words, as *half*, *talk*. Its nearest allied letter is *r*, and there is no letter, accordingly, with which *l* is more frequently interchanged, instances of the change of *l* into *r* and of *r* into *l* being very common in various languages. In fact, in the history of the Indo-European alphabet, *l* is considered to be a later modification of *r*.

**Labiatae**, *la'be a'tee*, the botanical name of the mint family, a very important and extensive order of plants, so named because most of the flowers present prominent upper and lower lips. The labiatae have a four-lobed ovary, which changes into four seed-like fruits. There are about 2800 species, mostly herbs or small shrubs, with opposite or whorled leaves and usually square stems. They are found throughout the world in temperate latitudes. Many, such as lavender and thyme, are valued for their fragrance; others, such as mint and peppermint, for their stimulating qualities, and still others, such as savory, basil and marjoram, as aromatics. Many of them possess bitter tonic qualities, and not a few bear beautiful flowers, that make them favorite garden plants.

**Labor**, AMERICAN FEDERATION OF. See LABOR ORGANIZATIONS.

**Labor Day**, a day set apart by the executive or legislative bodies of most of the states of the Union, at the solicitation of the labor unions and other industrial bodies, to be devoted to processions and other festivities in the interest of labor and laboring men. The first Monday in September is now almost unanimously designated as Labor Day.

**Labor, Department of**, an executive department of the United States government, established by act of Congress, March 4, 1913. Its purpose is to foster and develop the welfare of the wage earners. The department has complete charge of immigration and naturalization, and also includes the children's bureau and the bureau of labor statistics. The secre-

tary of labor is authorized to act as mediator in industrial disputes, or he may appoint an arbitration commission.

**Labor Or'ganiza'tions**, societies of laboring men organized to obtain mutual benefit and protection. These organizations are of two classes, those organized within separate trades, for the purpose of obtaining benefits for the workmen within those trades alone, and those admitting workmen of all trades and classes, for the purpose of improving the condition of laboring men as a whole. The methods of these two classes of organizations differ in accordance with these purposes. The former rely chiefly upon such direct influences as strikes or collective bargains, while the latter depend upon more indirect means, such as agitation and political action. The former, or *trades unions*, were organized first, appearing in England about the middle of the eighteenth century, and were the result of natural evolution from the ancient guilds (see GUILD). They did not attain great influence in the United States until about 1830. During the period from 1830 to 1850, the tendency was toward the formation of general organizations rather than trades unions, but after 1850, which marks the appearance of the Typographical Union, laborers in almost every line of trade organized separate local unions. About 1865 a reaction set in, marked by the organization, in 1869, of the Knights of Labor, a general society admitting members of all classes of labor, and including, when at its height, probably 200,000 workmen. Its influence in politics was at times notable, but this very activity also brought it into dispute, and since about 1885 it has gradually lost influence, being superseded more recently by the American Federation of Labor. This organization, founded about 1887, consists of the federation of trades unions, and it rapidly gained strength, until in 1912 it included nearly 30,000 local unions, with a membership of more than 2,000,000. Its policy was, at first, to keep out of politics, but to maintain a continuous agitation through the

## Labor Unions

general and special press and to obtain its demands by means of strikes and conferences. Later, however, it entered politics, devoting itself to securing the nomination and election of candidates favorable to the laboring classes. It sometimes worked through the old parties and sometimes through independent candidates.

The prejudice which formerly existed against labor organizations is rapidly dying out, as the public has learned to know and respect their leaders and has obtained a clearer understanding of their aims and principles. In the furtherance of their original purposes, namely, increasing the intelligence, skill and efficiency of the workmen, the elevation of character, the raising of wages and the improvement of the conditions of employment, the payment of insurance and of benefits to the sick and the general protection of the rights of laboring men, they have accomplished and are still accomplishing a great work. See STRIKE.

**Labor Unions.** See LABOR ORGANIZATIONS; FACTORY AND FACTORY LEGISLATION.

**Labouchere**, *lah boo shair'*, HENRY DUPREY (1831-1912), an English journalist and politician, born in Broom Park, Surrey. He was educated at Eton and entered the diplomatic service, where he remained ten years, part of the time serving at Washington, D. C. He was several times member of the British Parliament, serving continuously for Northampton for more than twenty years. He established *Truth*, a society and political journal, and was also connected with other British papers. As editor of the former, he attained fame by his vigorous criticisms of British policy, especially as an advocate of Irish home rule. He was a member of the commission which investigated the Jameson Raid of 1896, and during the Boer War he was outspoken in his opposition to the British government.

**Laboulaye**, *lah boo lay'*, EDOUARD RENE LEFEVRE DE (1811-1883), a French jurist and statesman, born in Paris. His early life he devoted to a careful study of European constitutional history, and he attained some distinction by the publication of *Memoir on the History of Landed Property in the West*. He soon after published another work, *Studies of the Civil and Political Condition of Women*, and two years later an *Essay on the Criminal Laws of the Romans*. During the time of Napoleon III he wrote and spoke with great earnestness in favor of liberalism and national spirit in France, and later he directed many ironical but patriotic essays against certain abuses in the

## Labyrinth

government of France, comparing them unfavorably with some American institutions.

**Labrador**, a peninsula on the east coast of British North America, between the Gulf of Saint Lawrence and Hudson Bay. The eastern part, to which, politically, the name Labrador belongs, is under the government of Newfoundland, while the remainder belongs to Canada, and forms part of the province of Quebec.

**Labradorite**, a mineral found on the coast of Labrador, formerly called *Labrador hornblende*. It is a lime soda feldspar and is distinguished by its remarkable changeability of color. Blue and green are the most common colors, but occasionally these are intermingled with rich flame-colored tints. It is sawed into slabs, and is employed in inlaid work.

**Labrador Tea**, a name given to two plants that grow in the north of Europe and in America north of Pennsylvania. They are species of heath and are low shrubs, with alternate, entire leaves, clothed underneath with rusty wool. The fragrant crushed leaves are used by the natives of Labrador as a substitute for tea.

**Labuan**, *lah boo ahn'*, a small British colony, consisting of an island on the western coast of British Borneo. It has an area of about thirty square miles and is inhabited chiefly by Malays from Borneo. It is well supplied with water and has a good harbor at Victoria, on its south-east side. Coal of excellent quality is plentiful, but has been mined hitherto with indifferent success. Other products are timber, caoutchouc, gutta-percha, wax and sago. This island was taken possession of by the British in 1844 and is under the government of the British North Borneo Company.

**Laburnum**, a tree, native of the Alps and cultivated for ornament. It is well and widely known for the beauty of its pendulous racemes of yellow, pea-shaped flowers. The seeds contain a poisonous substance which is called cytisine. The wood is hard and durable and is much prized by cabinetmakers, being wrought into a variety of articles.

**Lab'yrinth**, a structure having numerous intricate winding passages, which render it difficult to find the way through it. The legendary labyrinth of Crete, out of which no one could find his way, and in which all who entered became the prey of the Minotaur, was said to have been constructed by Daedalus. The hint of this legend was probably given by the fact that the rocks of Crete are full of winding caves. The Egyptian labyrinth was a build-



## Lac

ing situated in central Egypt, above Lake Moeris, not far from Crocodilopolis (Arsinoe) in the district now called the Fayoum. The building, half above and half below the ground, contained 3000 rooms. Imitations of labyrinths, called *mazes*, were once fashionable in gardens. They were made of hedges.

**Lac**, a resinous substance produced on numerous trees in India by the secretions of the lac insect. It is formed chiefly by the female insects, each of which inhabits a cell. The insect is a scale-like thing which, after fastening itself to a twig or the bark, draws a resinous substance from the juices of the plant. The insect dies, leaving a multitude of young beneath its shell. These bore their way through the body of their mother and swarm on the bark and immediately commence the secreting of lac, repeating the life history of their parent. In time the bark becomes covered to a depth of half an inch with the gum and the blood-red bodies of the insects. When the bark is put in hot water, the resin melts and the coloring matter is dissolved from the bodies of the insects. In India the cultivation of the lac insect has received much attention. *Shellac* is the name given to the resin when melted and reduced to a thin crust. Mixed with turpentine, coloring matters and other substances, lac is used to make various kinds of sealing wax. When dissolved in alcohol by different methods of preparation, it is made into various kinds of varnishes and lacquers. Lac dye and lac lake are coloring matters used in dyeing cloth scarlet. The lac insect is nearly related to the cochineal insect.

**Lac** or **Lak** (from Sanskrit *laksha*), an oriental term representing 100,000. In the East Indies it is especially applied to computations of money. Thus, a lac of rupees equals 100,000 rupees.

**Laccadives**, *lak'ka dive'z*, a group of fourteen small coral islands in the Arabian Sea, about 200 mi. off the coast of Malabar, belonging to British India. The islands are well supplied with fish and export quantities of cocoanut fiber. Cocoanut, cowries, jaggery and plantains, the only other exports, are of little importance. The natives are a race of Mohammedans, called Moplabs, of mixed Hindu and Arab descent. They are bold seamen and expert boat builders. Population, about 14,500.

**Lace**, *lase*, a delicate kind of network, formed of silk, flax or cotton thread, used for the ornamenting of dresses. Needle laces are called *point*; those made on a pillow by means of bobbins, *cushion*, or *bobbin*, laces.

## Lachrymal Glands

Specimens of the early Venetian point lace may still be seen in collections. The *point d'Alencon* is the most expensive and complicated of modern needle-laces. Among the cushion laces are the Honiton, made in England; Mechlin, made in Germany; Valenciennes and Chantilly, made in France, and Duchess lace, made in Belgium at Bruges, besides the celebrated Brussels, Venetian and Florentine laces. Guipure lace consists of a network ground, on which patterns are wrought in various stitches with silk. It was originally made in silk, gold or silver thread on little strips of parchment or vellum.

**Lace-bark Tree**, a native tree of the West Indies. It receives its common name from the fact that when its inner bark is cut into thin pieces and soaked, it assumes a beautiful net-like appearance. It is used by women for ornament, and the negroes manufacture matting from it.

**Lacedaemonians**, *las'e de mo'ny anz*. See SPARTA.

**Lace-winged Flies**, insects so called from their delicate wings, which have many netted spaces, like lace. The larvae are exceedingly voracious and feed upon plant lice.

**Lachesis**, *lak'e sis*. See FATES.

**Lachine**, *la sheen'*, a village of Canada, in the Province of Quebec. There are at Lachine famous rapids on the Saint Lawrence, which are avoided by means of a canal from Montreal harbor to a point above them. The shooting of the rapids is a favorite trip for tourists. Population in 1911, 10,778.

**Lachlan**, *lak'lan*, a river of New South Wales. It rises in the mountains on the east side of the state, a little south of the central line, flows northwesterly, then southwesterly and joins the Murray. It is 700 miles long, and in the last part of its course it expands into several marshes.

**Lachrymal**, *lak're mal*, **Glands**, the glands by which tears are secreted. There is one for each eye, and it is situated in a depression in the upper and outer part of the orbit. The fluid secreted is distributed over the inner surface of the upper eyelid by a number of minute ducts and is just enough at ordinary times to keep the mucous membrane and conjunctiva moist. After being spread over the eye by the upper lid, this fluid passes through two small openings near the inner angle of the eye into the lachrymal sac, which is the upper opening of the nasal duct, a small tube about a half inch in length

## Lackawanna

that conducts the fluid to the back nasal passage. The secretion of an unusual amount of fluid, such as is caused by irritation of the eye or excessive grief or joy, overflows the lower lid in the form of tears. See EYE.

**Lackawanna**, *lak a won'nah*, a river of Pennsylvania, rises in the northeastern part of the state and empties into the Susquehanna between Pittston and Wilkesbarre. It is about 50 miles in length and is chiefly important because of the valuable anthracite coal beds in its valley. This region is one of the most valuable coal regions in the United States. Scranton is the chief city on its banks.

**Laco'nia**, N. H., the county-seat of Belknap co., 100 mi. n. of Boston, Mass., on the Winnepesaukee River, between Lakes Winnisquam and Winnepesaukee, and on two lines of the Boston & Maine railroad. It is a prosperous manufacturing city, producing ears, hosiery, lumber and foundry products, paper boxes and other goods. The beautiful lake region, with its cool climate and good fishing, has made the place a popular summer resort. The chief buildings are a public library, an opera house, a hospital, the state home for feeble-minded children and a state fish hatchery. The place was settled about 1780, the town was incorporated in 1852 and the city was chartered in 1893. Population in 1910, 10,183.

**Lacquer**, *lak'ur*, **Ware**, the name of a ware covered with varnish, or *lacquer*. It is manufactured in Japan, China, India and Persia, but the Japanese ware is the best. This remarkable lacquer not only forms a very hard surface, but, unlike other varnishes, it stands a considerable heat without injury, so that in Japan lacquered vessels are used for hot soups and hot alcoholic drinks. The lacquered surface of the best ware is prepared by a very tedious process, owing to the number of coatings it receives. For the finishing coat the best lacquer is employed, and this is polished with calcined deer horn, finely powdered, the finger and a little oil bringing up the final gloss. Many cheap imitations of lacquer ware are placed on the market.

**Lacrosse**, *la kros'*, a game of ball originating with the Indians of Canada, played somewhat on the principle of football, by twenty-four persons, twelve on a side, each of whom carries an implement called a *crosse*. The field is as near 125 yards long as possible, and at each end are two goal posts, 6 feet apart and 6 feet high. Whenever either side succeeds in putting the

## Lactic Acid

ball between the posts of their opponent's goal, by throwing or striking with the *crosse* or by kicking it, it scores a goal, and the side that scores the most goals within the time fixed for playing, wins. The *crosse* is something like an



CROSSE AND BALL

elongated lawn tennis racket, woven with eatgut, which must give a flat surface. In the widest part, the *crosse* should not exceed one foot, but it may be of a length to suit the player.

**La Crosse**, Wis., the county-seat of La Crosse co., 200 mi. n. w. of Milwaukee, on the Mississippi River and on the Chicago, Burlington & Quincy, the Chicago & Northwestern and other railroads. The city is near extensive forests of pine and hardwood timber and is an important farming, dairying and manufacturing trade center for a large section of the Northwest. Very large lumber mills are located here, and the principal manufactures are agricultural implements, knit goods and flour. The city has the Washburn Public Library, an asylum for the insane, the Saint Francis and United States Marine hospitals and a state normal school. The place was settled in 1841 and was incorporated in 1856. Population in 1910, 30,417.

**Lacteals**, *lak'te alz*, **THE**, the lymphatics of the small intestines. The lacteals have their origin in small projections, called *villi*, which are found in the mucous membrane of the small intestines. Each villus has its own lacteal vessel or network of vessels. The lacteals discharge their contents into the *receptaculum chyli*, from which the contents pass to the thoracic duct. The chief office of the lacteals is to absorb the fatty particles of the chyle, which, after they have entered these vessels, change their character. In the intestines, these particles exist in the form of minute drops, while in the lacteals they are found to be as fine as dust and to have changed from the kind of fat that was eaten—tallow, butter or lard—to the fat of the animal in whose lacteals they are found. See THORACIC DUCT.

**Lac'tic Acid**, an acid found in several animal liquids, in milk when it becomes sour, in the fermentation of several vegetable juices and in the putrefaction of some animal matters. It is a colorless, inodorous, very sour liquid, of a syrupy consistence. It has some use as a medi-



## Ladd

cine, particularly in dissolving the membrane in diphtheria.

**Ladd, GEORGE TRUMBULL** (1842- ), an American educator and psychologist, born at Painesville, Ohio. He was educated at Western Reserve College and Andover Theological Seminary. On completing his education, he served as pastor of churches in Edinburgh, Ohio, and Milwaukee, Wis., and then became professor of philosophy at Bowdoin College. From here he was elected to a similar position at Yale, where he succeeded President Porter as professor of moral philosophy. Professor Ladd is widely known in the United States and Europe through his writings and lectures on psychology, and he is considered one of the leading authorities on this subject from the physiological point of view. He is the author of numerous works on psychology, a number of which have been translated into foreign languages. Among the best known of these are *Elements of Physiological Psychology*, *Outlines of Physiological Psychology*, *Primer of Psychology*, *Introduction to Philosophy*, *Philosophy of Mind*, *Philosophy of Knowledge* and *Psychology, Descriptive and Explanatory*.

**Ladoga, lah'do ga**, a lake in northwestern Russia, over 7000 sq. mi. in area. It is the largest lake in Europe. The navigation is dangerous for small craft, but the lake is very important commercially, and canals along its southern shore connect the rivers Volkhov and Neva. The fishing is important.

**Ladrone' Islands or Mariana Islands**, a group of sixteen islands in the Pacific Ocean, east of the Philippines and the Caroline Islands. Guam is the southernmost and largest; next in importance are Saipan, Tinian and Rota. The islands are mostly of volcanic origin and are very rugged, but their general aspect is picturesque, as they are densely wooded and covered with a perpetual verdure. The soil is extremely fertile. The islands were discovered by Magellan in 1521. Excepting Guam, which belongs to the United States, the whole group was sold by Spain to Germany in June, 1899. See GUAM.

**La'dybird**, the name of a number of small insects, or beetles, common on trees and plants in gardens. They are usually rounded in form, many of them of bright colors, ornamented with black or scarlet spots. They are of great service to vegetation on account of the number of aphides, or plant lice, which they destroy.



LADYBIRD

## Lafayette

**La'dysmith**, a town in Natal, South Africa, on the Klip River, 84 mi. n. w. of Pietermaritzburg, with which it is connected by rail. In the Boer War the British Army, commanded by Sir George White, was besieged here from October, 1899, to February 28, 1900. Population, estimated at 3000.

**Lady's Slipper**, one of a genus of beautiful orchids (cypripedium), several species of which are natives of the United States. The lip of the corolla is large and inflated, resembling a slipper. Our species are either yellow or white, or white mottled and striped with pink. Foreign species differ from American greatly, both in shape and color. They are easily cultivated. See ORCHIDS.



LADY'S SLIPPER

**La Farge, la fahrzh'**, JOHN (1835-1910), an American painter, born in New York. He went abroad and studied in Paris. After his return to America his first work was done on the mural decorations for Trinity Church, Boston. After this he directed his attention to the art of glass painting and window designing and became associated with Saint Gaudens in the building of the King's Sepulcher Monument at Newport, R. I. In 1887 he executed one of his finest works, the large altarpiece in the Church of the Ascension, New York. The subjects which La Farge undertook were numerous and varied, including portraits, landscapes and religious subjects. Among his best paintings are *The Arrival of the Magi* and decorations in the Brick Church, New York, and the Congregational church, Newport, R. I.

**Lafayette, lah ja yet'**, IND., the county-seat of Tippecanoe co., 64 mi. n. w. of Indianapolis, on the Wabash River and on the Cleveland, Cincinnati, Chicago & Saint Louis, the Wabash and other railroads. The city has a beautiful location on the bluffs and terraces of the river and is surrounded by an agricultural region. The manufactures include boots, shoes, wagons, bicycles, bridges, agricultural implements and many other articles. The city is the seat of Purdue University, has a good high school, a public library, Saint Elizabeth's Hospital and Saint Joseph's orphan asylum. The city was built near the site of the French fort, Post

## Lafayette

Oniatanon, which was constructed about 1720. The fort was taken by the British in 1760, but was captured by the indians the next year. Lafayette was settled in 1820 and was incorporated in 1854. Population in 1910, 20,081.

**Lafayette, MARIE PAUL JEAN ROCH YVES GILBERT MOTIER, Marquis de (1757-1834), a**



MARQUIS DE LAFAYETTE

French general and statesman. He began his career at the court of Louis XV, at the period when hostilities were commencing between Britain and the American colonies. In 1777 he left France for America, having fitted out a vessel for himself, and was received most cordially by Washington and his army. He was made a member of Washington's staff, with the rank of major general, was wounded at Brandywine and commanded the vanguard of the American army at the capture of Cornwallis. He returned to France on the close of the campaign, was called to the Assembly of the Notables, and in 1789 was elected a member of the States-General, which he was partly instrumental in converting into the National Assembly. In the Assembly he proposed a declaration of rights and the decree providing for the responsibility of the officers of the Crown. Two days after the attack on the Bastille, he was appointed commander in chief of the National Guards of Paris. It was through his means that the king and queen were saved from the mob that had taken possession of the palace at Versailles. His popularity was not great with any party in the state; he was too moderate for the radicals

## Lafontaine

and too liberal for the court party.

After the adoption of the constitution of 1790, Lafayette resigned all command and retired to his estate of La Grange. In 1792 he was appointed one of the three major generals in command of the French armies and directed some small operations on the frontier of Flanders, at the same time striving unsuccessfully to overthrow the Jacobins at Paris. Commissioners were sent out by the Jacobins to arrest him, and he determined to leave the country and take refuge in some neutral ground. He was captured by an Austrian patrol and confined at Olmütz till 1797, when Napoleon procured his release; and on his return to France he took little part in public affairs, on account of his opposition to the Consulate and the Empire. In 1818 he was chosen a member of the Chamber of Deputies and was a constant advocate of liberal measures. In 1824 he visited the United States and was received with great enthusiasm. Congress voted him \$200,000 and a township of land. During the revolution of July, 1830, he was appointed general of the National Guards of Paris, and it was chiefly to him that Louis Philippe owed his crown. A monument to Lafayette was erected in New York in 1876. His son, George Washington Lafayette, was prominent in French politics during the early nineteenth century.

**LaFollette, *la fol'let*, ROBERT MARION (1855- )**, an American lawyer and politician, born at Primrose, Wis. He graduated at the University of Wisconsin in 1879, was admitted to the bar in the following year, immediately became district attorney of his county and served for two terms. In 1885 he was elected member of Congress and during a service of six years attained prominence as an orator and for a conspicuous part in framing the McKinley tariff law. He was elected governor of his state in 1900 and was twice reelected. During his governorship he led a successful movement for the direct nomination of candidates for office, for the adequate taxation of railway property and for the control of railway rates by a state commission. Since 1905 he has been a leader in progressive legislation in the United States Senate. In 1908 and 1912 he was a candidate for the Republican nomination for president. (See illustration on next page.)

**Lafontaine, *lah'fon tane'*, JEAN DE (1621-1695)**, a French writer. His early verses won him influential friends, who induced him to go



## Lagerlof

to Paris and provided for him while there. He enjoyed the friendship of Molière, Boileau, Racine, and all the first wits of Paris, by whom he was much beloved for the candor and simplicity of his character. But he was no favorite with Louis XIV, who even hesitated some time



ROBERT M. LA FOLLETTE

to confirm his nomination to the French Academy. The first volume of his *Tales* appeared in 1664, a second in 1671. Of his *Fables* innumerable editions have appeared since the first volume in 1668; it is through them he is universally known.

**Lagerlöf**, *lah'ger luf*, SELMA (1858- ), a Swedish novelist, born on her father's estate in Wermland, Sweden. She was educated in Stockholm at the Royal Women's Superior Training College, and after her graduation taught school for ten years. Her first novel, *The Story of Gösta Berling*, appeared in 1891, while she was still teaching. It at once placed her in the front rank of Scandinavian authors. The popularity of this book was even exceeded by that of *The Miracles of Antichrist*, a brilliant portrayal of country life, published in 1897. *The Adventures of Nils*, based on the fairy tales of the Swedish people, was written at the request of the Association of Common School Teachers, and is used as a supplementary reader in Swedish schools. Among her other books are *From a Swedish Homestead*; *Jerusalem*; *Legends of Christ*; *Invisible Links*; and *The Girl from the Marsh*. In 1909 she received the Nobel Prize in literature.

## Lake

**Lago Maggiore.** See MAGGIORE, LAKE.

**La'gos**, a British colony in western Africa. It consists of a strip of land along the Gulf of Guinea, and its area is about 3460 square miles. The chief article of commerce is palm oil. Acquired by Britain in 1861, Lagos and the Gold Coast were for some time under one governor; but in 1886 Lagos was put under an independent administrator of its own. In 1906 Lagos became part of Southern Nigeria, with the town of Lagos as capital. Population, 1,500,000.

**La Guayra**, *la gwi'ra*, the chief seaport of Venezuela, situated about 5 mi. from Caracas, of which it is the port. The chief objects of interest are a statue of Vargas, a celebrated physician of La Guayra, several churches and hospitals. The harbor has been improved recently and is protected by a fort. The chief industries are manufactured goods and exports of coffee, cocoa and skins. The port is connected with Caracas by a railroad 29 miles long. It was founded in 1588. Population in 1910, about 12,000.

**Lahore'**, a city of British India, capital of the Punjab and administrative headquarters of Lahore division and district. The native town is surrounded by a brick wall 15 feet high, flanked by bastions. The streets of the native town are exceedingly narrow, unpaved and dirty, and the houses have, in general, a mean appearance. The European quarter lies outside the walls on the south and dates from 1849. Among the public buildings and institutions are the Punjab University, the Oriental College, a medical school, a law school, Mayo Hospital and Lawrence and Montgomery halls. Its most important industry is the manufacture of carpets. In 1524 Lahore became the seat of the Mogul Empire, under which it reached its greatest splendor. Before passing into the hands of the British, it was the capital of the Sikhs. Population in 1911, 228,687.

**Laisser Faire**, *lay say fair'*, in economics, a term applied to the theory that a public authority should interfere in the concerns of a community as little as possible; that wealth tends to be produced more peaceably and economically where a government leaves individuals free to produce and distribute on mutually arranged terms. This rule in practice has various exceptions, as in matters of education and the employment of children and the promotion of health or morality. Advocates of the theory generally agree that the state should perform those functions that cannot be adequately performed by the individual.

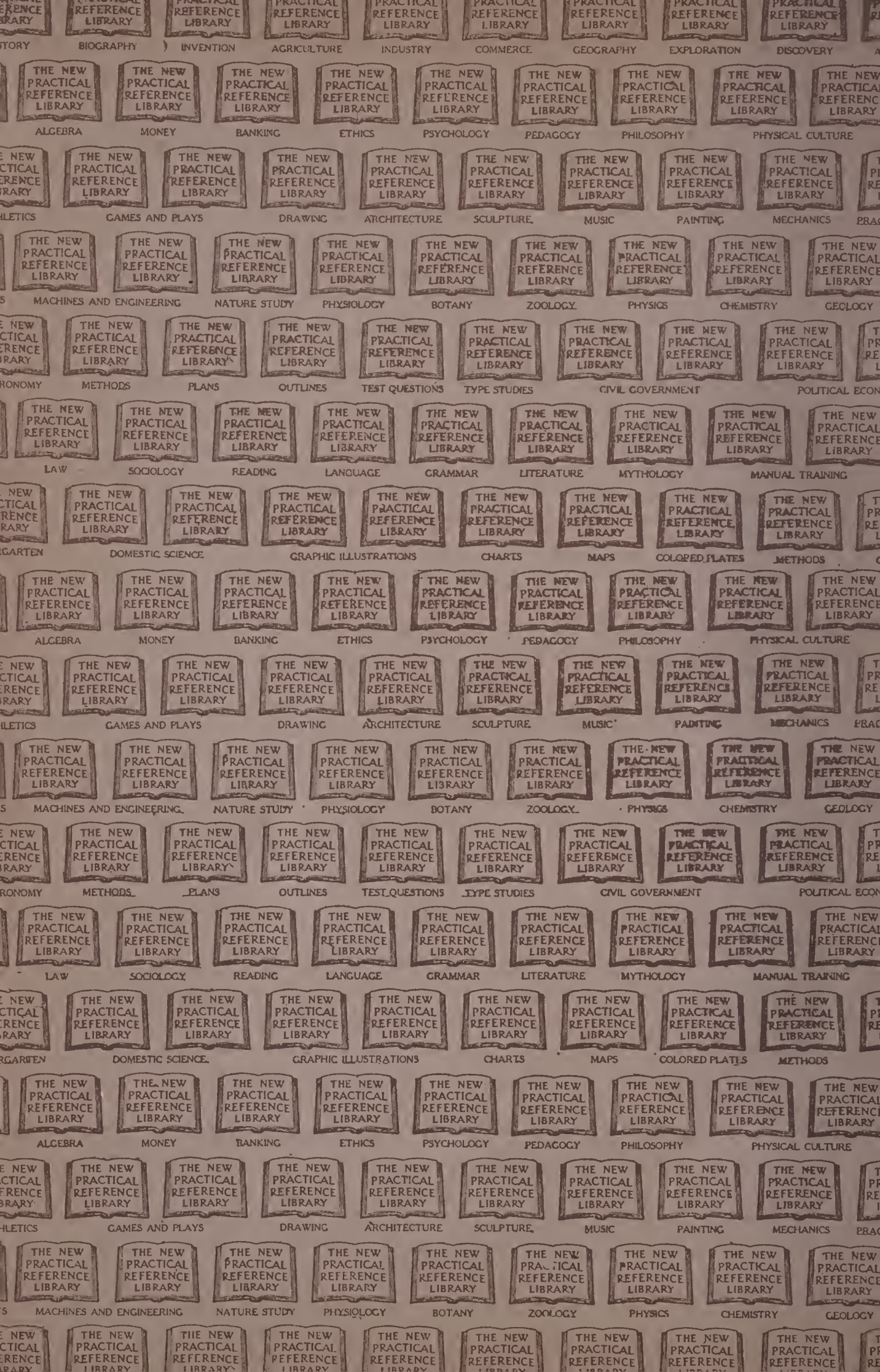




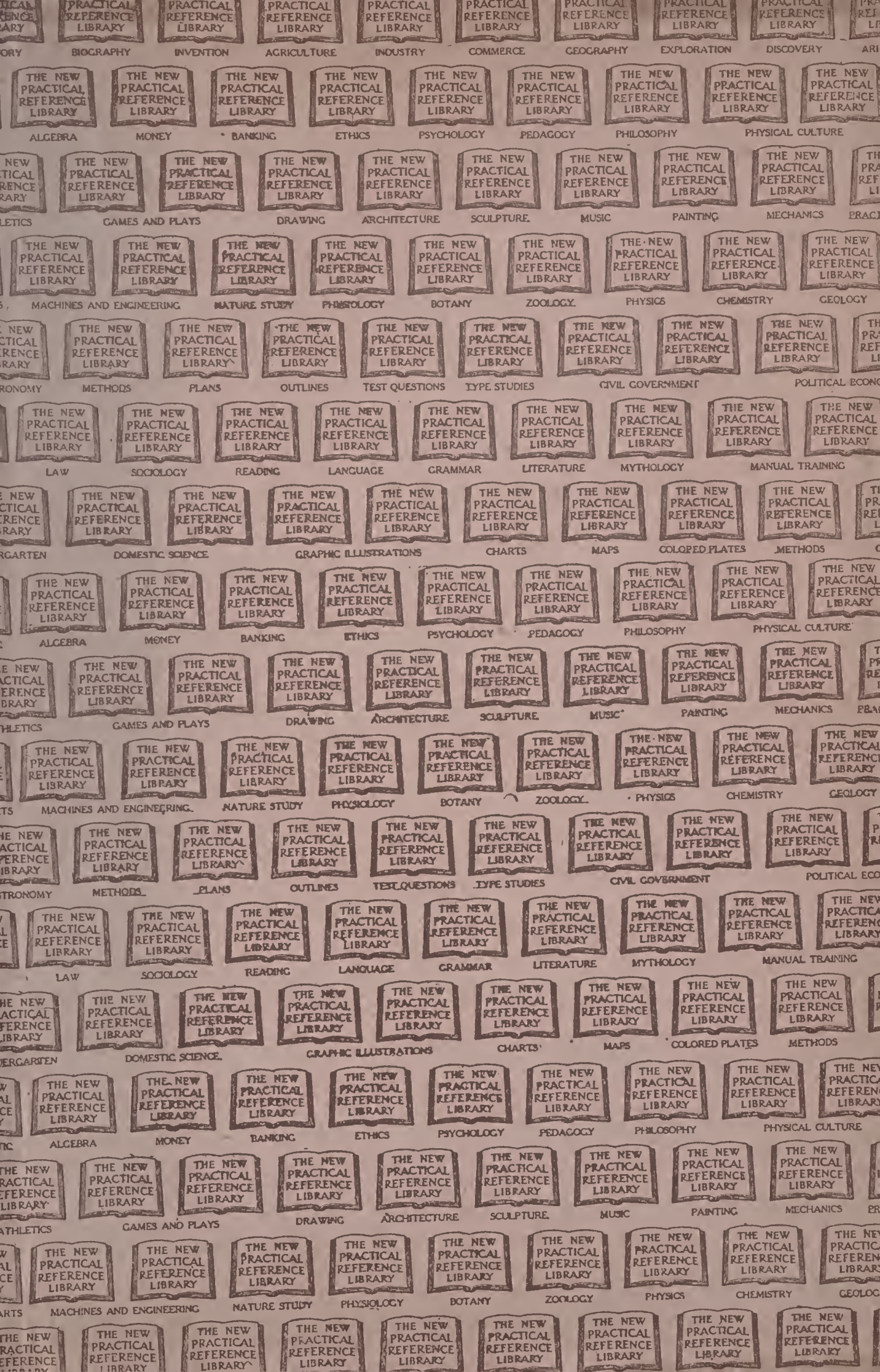














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